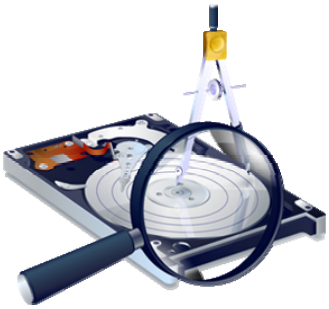
Acronis

Disk Director Suite 10.0

User's guide



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Introduction

What is Acronis Disk Director Suite?

Acronis Disk Director Suite is a complex program that includes **partition and boot managers** and hard disk data editing tools. With it, you can:

- Create hard disk partitions
- Resize, move, split and merge partitions without data loss or destruction
- Convert partitions to other file systems without data loss
- Copy (move) partition contents
- Delete partitions
- Recover hard disk partitions that were accidentally deleted or damaged due to a hardware or software error
- Format, label, assign letters, hide and unhide partitions, set active partitions and perform additional disk management operations
- Install multiple operating systems on a single PC
- Boot installed operating systems from any hard disk partition
- Boot installed operating systems from under Windows
- Install several operating systems on a single partition
- Hide or protect with a password any operating system on your PC
- Duplicate installed operating systems and define different configurations for each copy
- Recover boot records, files and folders structure, find lost clusters, remove viruses, etc.

Some terms of this guide might be unfamiliar. Appendix A «Hard Disk And File Systems » and Appendix C «Glossary» provide descriptions of some hard disk data storage components and used terms.

What's new in Acronis Disk Director Suite 10.0?

- **Splitting / merging partitions**

  You can split a partition in two, moving the selected folders to the new partition and leaving the rest of the data on the old one. This operation can also be used for creating an empty partition from another partition's free space. You can merge two partitions, as well, even if their file systems are different. All data will stay intact and reside on the resulting partition.

- **Exploring and managing partitions contents**

  You can explore or manage partition contents before configuring operations on that partition directly from Acronis Disk Director Suite. It enables you to copy, paste,

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rename and delete files and folders, create folders on the selected partition, and even edit text files.

- **Support of boot from CD/DVD in Acronis OS Selector**

  If you insert a bootable CD/DVD, it will be detected and displayed in the Acronis OS Selector boot menu/main window along with available operating systems. The CD/DVD can contain any operating system or bootable program – no matter, you will see its icon in the boot menu. It allows you to boot or install an operating system from a CD.

- **OS Detection Wizard**

  The OS detection tool allows an unintentionally deleted operating system to be found and added to the OS Selector boot menu. Also, if an operating system on a newly connected disk was not detected automatically, you can try to add it to boot menu using this tool.

- **Boot from second HDD**

  Generally, Windows can boot from HDD only if its boot files reside on the first (according to BIOS) hard disk. If you connect a live system HDD, taken from another computer (where it was the first disk), to your computer, where it becomes the second (third etc.) disk, boot from that HDD will be impossible, even if the hardware is identical on both computers. Acronis OS Selector now can manage situations like that and automatically set the disk order required for booting the selected operating system.

  Besides, you can choose the disk order when installing an additional Windows operating system, so that its boot files will be installed on the second (third etc.) disk.

- **Viewing logs**

  Acronis Disk Director Suite now keeps working logs. They store information about implemented partition operations, including reasons for failure, if any.

- **The new Bootable Media Builder, common for all Acronis products**

  The new Bootable Media Builder is able to create bootable media for every Acronis product installed on the computer, or one bootable disk for several products. It also supports creating a bootable disk ISO image on the hard disk and storing the bootable programs versions on PXE server.

Software use conditions

The conditions of use are listed in the supplied «License Agreement». The unique serial number is the confirmation of your legal purchase and usage of Acronis Disk Director Suite on your system.

Under current legislation, the «License Agreement» is considered a contract between you and Acronis Inc. The contract is a legal document and its violation may result in legal action.

Illegal use and/or distribution of this software will be prosecuted.

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Technical support

Users who have legally purchased and registered their copy of Acronis Disk Director Suite will receive free technical support from Acronis. If you have installation or working problems that you can't solve by yourself using this manual and the readme.txt file, e-mail the technical support team. You will need to provide the serial number of your Acronis Disk Director Suite copy bundled with the program.

Before you do this, you will have to register your copy at http://www.acronis.com/homecomputing/my/products/registration/ .

Support URL: http://www.acronis.com/homecomputing/my/support/

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Chapter 1. Installation and Use

1.1 System Requirements

To take full advantage of Acronis Disk Director Suite you should have:

- A PC-compatible computer with a Pentium or similar CPU
- 128 MB RAM
- A floppy or a CD-RW/DVD-RW drive
- A mouse (recommended)

1.2 Supported Operating Systems

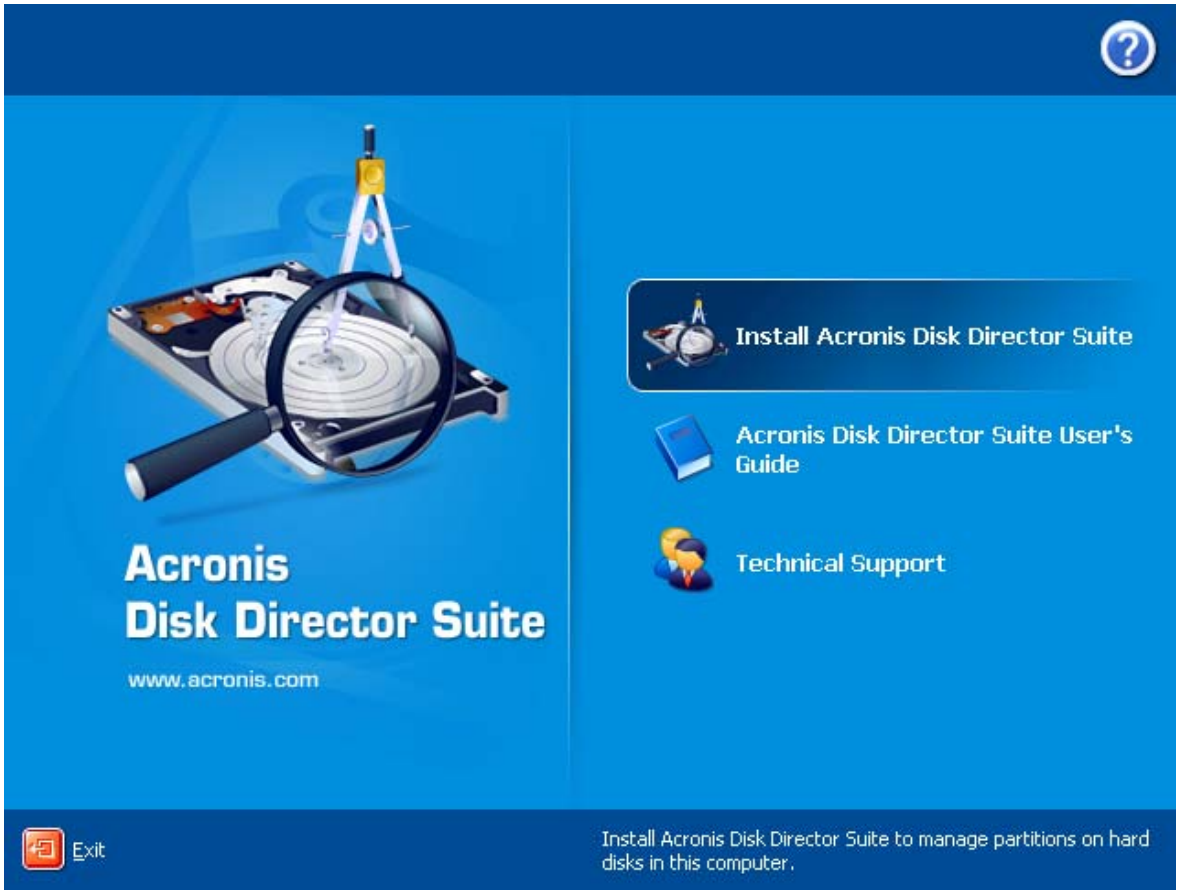
- Windows NT 4.0 SP 6
- Windows 2000 Professional SP 4
- Windows XP SP 2
- Windows Vista (all editions).

1.3 Installation Process

1.3.1 Acronis Disk Director Suite installation

To install Acronis Disk Director Suite:

1. Run the installation program.


Acronis
Disk Director Suite
www.acronis.com
Install Acronis Disk Director Suite
Acronis Disk Director Suite User's Guide
Technical Support
Exit
Install Acronis Disk Director Suite to manage partitions on hard disks in this computer.

2. Follow the setup program instructions.

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3. You will be prompted to choose **Typical**, **Custom** or **Complete** installation. If you pick **Custom**, you can choose not to install the **Bootable Media Builder,** a tool for creating bootable media (see Chapter 9 "Bootable Media Builder"). You might not need this tool if you purchased a boxed product that contains a bootable CD.

If you have another Acronis product with its own Bootable Media Builder, such as Acronis True Image, installed on your computer, the installation program will automatically detect it and will not install another Bootable Media Builder regardless of your setting. You can create bootable media for all Acronis products using either product.

4. After installation, reboot your PC.

1.3.2 Acronis OS Selector installation

To install Acronis OS Selector, you should first install Acronis Disk Director Suite. Then select **Start → Programs → Acronis → Acronis DiskDirector → Install Acronis OS Selector** and follow the setup program instructions. If you already have Acronis OS Selector installed on your computer, it will be updated by the new version.

During the installation of Acronis OS Selector, the hidden system folder BOOTWIZ will be created on your PC to keep the program loader. Acronis OS Selector will also copy OS system files found on your PC into this folder to avoid problems during bootup and to simplify adding new OS in the future.

Acronis OS Selector can be installed in the **Typical** or **Custom** variants.

During **Typical** installation, the BOOTWIZ folder will be created in the system hard disk partition that contains the Windows files and folders.

Using the **Custom** installation option, you will be able to select the location of the BOOTWIZ folder. This might come in handy when a system partition is accidentally destroyed or damaged. In that case, you will be able to access the Acronis OS Selector boot menu even if the system partition is inaccessible. From this menu, you can run the standalone version of Acronis Disk Director Suite, saved in the BOOTWIZ folder as well, to create and restore partitions and access the Acronis Disk Editor tool.

1.4 Upgrading Acronis Disk Director Suite

If you already have Acronis Disk Director Suite installed on your PC, the installation program will automatically find it and prompt you on its replacement with the new version.

Software upgrades (with certain bug fixes) may be downloaded free from the Acronis Web site: http://www.acronis.com/support/updates/.

1.5 Removing Software

To remove Acronis Disk Director Suite, select **Start → Settings → Control Panel → Add or Remove Programs → Acronis Disk Director Suite → Remove**. You will see

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a dialog to confirm removal. Click **Yes** to confirm and Acronis Disk Director Suite will be completely removed along with Acronis OS Selector.

To remove Acronis OS Selector only, select **Start → Programs → Acronis → Acronis DiskDirector → Install Acronis OS Selector.** Then select **Uninstall Acronis OS Selector** in the installation program window and follow the program instructions.

1.6 User Interface

When Acronis Disk Director Suite software is installed, it has a graphical user interface that is controlled by the mouse or by `Tab`, `Shift+Tab`, `Left`, `Right`, `Up`, `Down`, `Space`, `Enter` and `Escape` keys.

If you regularly work with Windows or X Window applications, you should not encounter any problems with the Acronis Disk Director Suite interface.

Acronis Disk Director Suite uses a series of dialogs requiring the user to choose among several actions or to mark partitions or disks to be manipulated.

1.7 Before You Run Acronis Disk Director Suite

PLEASE NOTE: Operations on system, application or data partitions must be done very carefully to avoid potential hard disk booting or data storage problems.

Acronis Disk Director Suite has been thoroughly tested to work with numerous hard disks, so if problems arise, they are likely caused by improper use, not the software.

A power loss, turning off the PC or pressing the **Reset** button on your PC during the repartitioning procedure could result in partition damage and data loss.

Please take all necessary precautions and following these **simple rules**:

1. Create a disk image of the disk on which partitions are to be reconfigured. This will ensure that your data will not be lost under any circumstances.

Almost all current PCs feature CD-RW drives. Having your most important data backed up to a hard disk or CD will enable you to work on the disk partitions with full confidence that your data is safe.

Acronis offers extremely effective hard disk and partition disk imaging software — Acronis **True Image** (visit http://www.acronis.com/products/trueimage/). It creates a backup stored in a compressed archive file whose contents can be restored at any time.

2. Test your disk to make sure it's fully functional and does not contain bad sectors or file system errors.

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You can invoke system hard disk checking tools directly from Acronis Disk Director Suite by selecting **Disk → Check** or clicking **Check the selected partition for errors** toolbar button.

3. Do not perform any partition operations while running other software that has low-level disk access, such as antivirus or backup tools. Close such programs before running Acronis Disk Director Suite.

If you follow these simple rules, you will protect yourself against data loss.

1.8 Running Acronis Disk Director Suite

1.8.1 Running under Windows

Under Windows, select **Start → Programs → Acronis → DiskDirector → Acronis Disk Director Suite.**

Under Windows, Acronis Disk Director Suite can perform operations on any partitions, including primary, logical, system or data *without* rebooting your PC.

1.8.2 Running Acronis Disk Director Suite for the first time

When you run the program for the first time, you will be prompted to choose whether you want to work in **Automatic Mode** or **Manual Mode**.

Automatic Mode provides enough functionality to create almost any partition configuration on your PC hard disks.

If you need a detailed partition structure representation with a complete set of partition operations and controls, select **Manual Mode**.

You can switch between modes at any time (see 2.1.3 «Switching modes»).

1.8.3 Running from bootable diskettes or CD

Previously, we explained how to create bootable diskettes or a CD (see 1.2 «Supported Operating Systems

- Windows NT 4.0 SP 6
- Windows 2000 Professional SP 4
- Windows XP SP 2
- Windows Vista (all editions).

Installation Process»). While working with Acronis Disk Director Suite, you may need to use the bootable media: (1) after a serious Windows failure or (2) to work on a Linux-based PC. (See also Chapter 9 «Bootable Media Builder».)

Your PC BIOS must be set correctly to boot and run the software from bootable diskettes or CD.

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Chapter 2. Beginning The Work

2.1 Acronis Disk Director Suite Logical Organization

Acronis Disk Director Suite provides **two operation modes** (see 1.8 «Running Acronis Disk Director Suite»):

- **«Automatic partition operations»** mode is designed for the **most frequent** operations suitable for the majority of users
- **«Manual partition operations»** mode for **any partition operations**. This mode is intended for experienced users with some knowledge of disk data storage organization; it provides full operational control

2.1.1 Automatic partition operations

In this mode, all actions are performed through task-based wizards.

- **Create partition wizard** — enables you to create a partition from unallocated disk space or other partitions
- **Increase free space wizard** — enables you to enlarge a partition at the expense of unallocated disk space or other partitions
- **Copy partition wizard** — enables you to copy a partition
- **Recover partitions wizard** – enables you to recover any deleted or damaged partitions. Working with **Recover partitions wizard** is described in detail in a separate chapter of this guide. See Chapter 5 «Working with Acronis Recovery Expert». With these wizards, even an inexperienced user will be able to perform the recovery operations using step-by-step instructions.

2.1.2 Manual partition operations

In this mode, experienced users have access to all Acronis Disk Director Suite features.

Partition operations are performed by entering necessary parameters into dialog boxes.

The main difference between the automatic and manual modes is that wizards perform **operations series** in the automatic mode and **only single** disk/partition operations in the manual mode.

2.1.3 Switching modes

Having selected an operation mode during installation (see 1.2 «Supported Operating Systems

- Windows NT 4.0 SP 6
- Windows 2000 Professional SP 4
- Windows XP SP 2
- Windows Vista (all editions).

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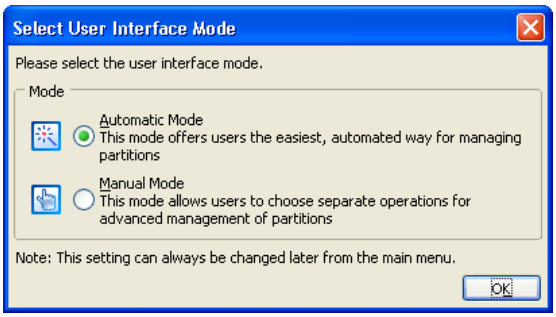
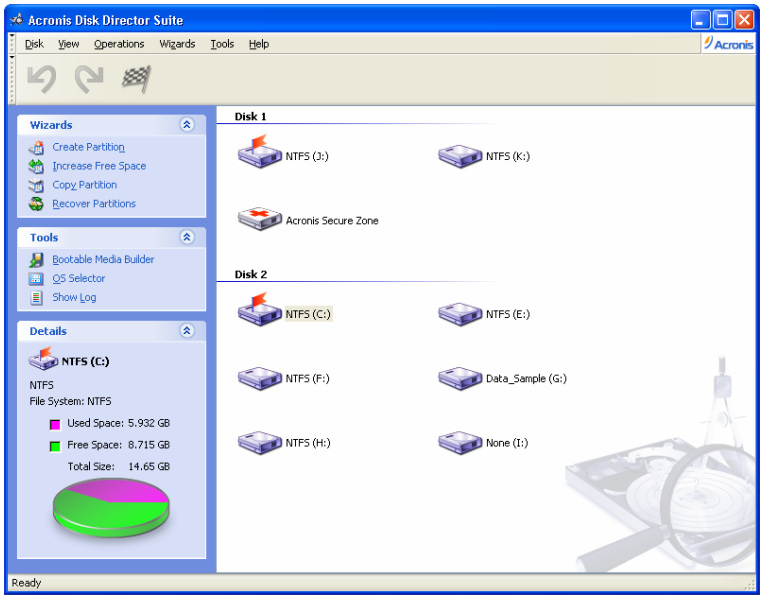
Installation Process»), you can switch to another mode at any time. Select **View → Automatic Mode** for the automatic mode or **View → Manual Mode** for the manual.


Select User Interface Mode
Please select the user interface mode.
Mode
Automatic Mode
This mode offers users the easiest, automated way for managing partitions
Manual Mode
This mode allows users to choose separate operations for advanced management of partitions
Note: This setting can always be changed later from the main menu.
OK

2.2 Acronis Disk Director Suite Main Window

The program is controlled through the main window. It includes the menu, toolbar, and disk and partition tree (shown/hidden through the **View** menu). This represents the computer **disk and partition list**.

The main window appearance differs depending on the selected operation mode (see 2.1 «Acronis Disk Director Suite Logical Organization»). The difference applies to the available operation list in the main menu, partition context menus, sidebar and toolbar, and the amount of partition structure details represented.



Acronis Disk Director Suite main window, Automatic Mode

In the manual partition operations mode, the main window also includes all unallocated disk space, while only partitions are shown in the automatic mode. Partition creation, free space and copy wizards **automatically** recognize unallocated disk space in this mode.

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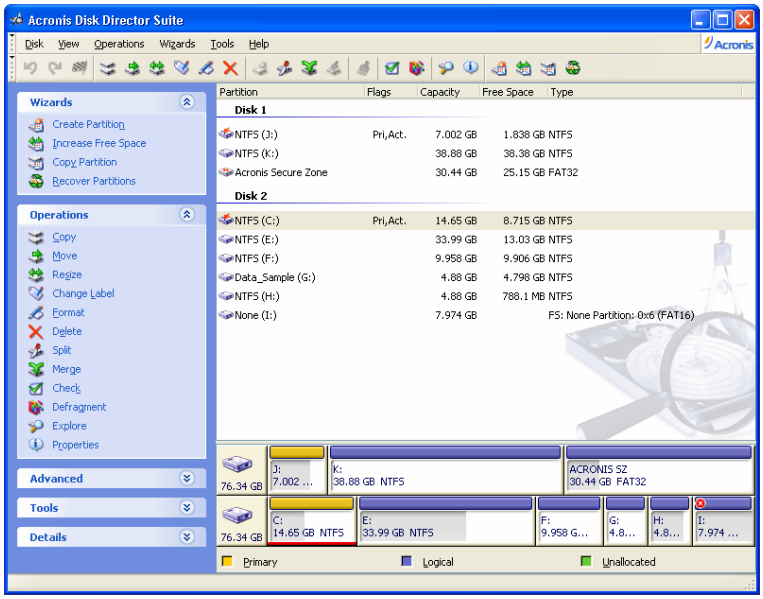

Acronis Disk Director Suite main window, Manual Mode

2.2.1 Disk and partition information

The main window shows the partition's disk number, assigned letter, label, type, status, size, free space size and file system. Disk and partition information is also provided in the partition and disk tree.

The bottom part of the main window **graphically** indicates the selected disk and its partitions as rectangles with basic data on them (label, letter, size, type, file system).

2.3 Calling Partition Operations

All partition operations in both modes are called and executed similarly.

2.3.1 Calling the main operations

Any operation can be launched:

- By selecting it from the Disk submenu
- From customizable toolbars
- From the partition context menu (both in the main window and the graphical panel)
- From Operations and Advanced sidebar lists

Note that the list of **available** operations in the **Disk** submenu and the **Operations** sidebar depends on the selected partition type. This holds true for unallocated space as well.

2.3.2 Advanced operations

Advanced operations are:

- **Convert** — convert the FAT16 partition file system to FAT32, Ext2 to Ext3, and vice versa

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- **Hide/Unhide** — hide/unhide a partition
- **Set Active** — set an active partition
- **Resize Root** — resize FAT16 partition root
- **Change Bytes per i-node** — resize i-node table (Linux Ext2/Ext3)
- **Change Cluster Size** — change FAT16/FAT32 partition cluster size
- **Change Type** — change partition type
- **Recover** — recover deleted or damaged partitions (see Chapter 5 «Working with Acronis Recovery Expert»).
- **Edit** — edit hard disk data (see Chapter 6 «Working with Acronis Disk Editor»).

Advanced partition operations are called from the **Advanced** sidebar list, the same partition context menu item or toolbar button.

Note that the additional operations list of the partition context menu or toolbar depends on the selection of a partition type. For example, the FAT16 partition menu contains **Advanced → Resize Root**; this is absent in the FAT32 partition menu. The Linux Ext2/Ext3 partition context menu contains **Advanced → Change Bytes per i-node,** which is not found on the FAT menus**.**

2.3.3 Invoking Acronis Disk Director Suite wizards

Wizards are invoked from the **Wizards** submenu and the corresponding sidebar list. For example, select **Wizards → Create Partition** for the partition creation wizard.

2.4 Partition Operation Properties

2.4.1 Displaying operation results

Results of any disk partition operation are immediately displayed in the Acronis Disk Director Suite main window.

If you create a partition, it will be immediately shown in the hard disk partition list in the main window, as well as in graphical form on the bottom of the main windows.

Any partition changes, including resizing, relocating and labeling are also immediately displayed in the main window.

2.4.2 Pending operations

All operations are **pending** until the user issues the command for the changes to be made permanent. Until then, Acronis Disk Director Suite will only show the new partition structure that is provided by operations to be performed.

Therefore, you can view the graphical representation of the new partition structure first and then decide whether to perform or cancel specific operations.

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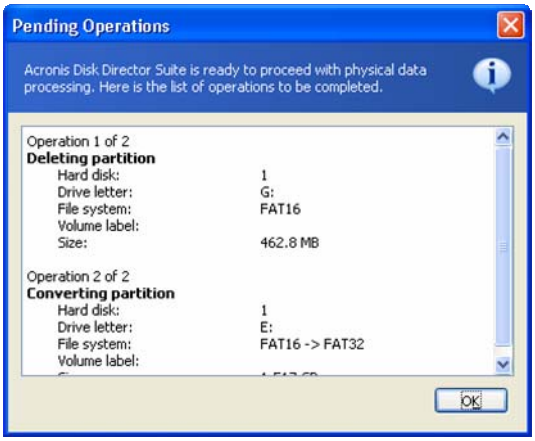
2.4.3 Viewing delayed operations

All pending operations are added to the pending operations list. You can view it in the **Pending Operations** window by clicking **Operations → Show**:



Pending operations list

This organization enables you to control all planned operations, double-check your intended work, and undo operations fully or partially, if needed.

2.4.4 Performing pending operations

To execute planned hard disk operations, the user has to select one of the two following commands:

- Select **Operations → Commit** in the main menu
- Click **Commit Pending Operations** toolbar button

To prevent you from performing any unintentional change on your disk, the program will first display the list of all pending operations. Clicking **Proceed** will launch their execution. You will not be able to undo any actions or operations after you **Proceed** the operation.

2.4.5 Modifying pending operations

All of your actions result in the creation of pending operations. For example, you can create a new partition by providing its type, file system, size, location and label. You can easily view the pending operation for the partition you are working on (see 2.4.3 «Viewing delayed operations»).

You can always change any operation parameter, including type, file system, size, location, etc. before performing the operation. Using **Change type**, **Convert**, **Move**, **Resize**, and similar operations, you will also see that your actions *do not* result in creating new pending operations. These actions will only change the existing pending operation parameters.

If you decide to change the label of **a different**, existing partition, Acronis Disk Director Suite will immediately create a **new** pending operation. Thus the same actions sometimes result in the creation of a new pending operation or modification of existing operations.

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2.4.6 Undoing user actions

Calling wizards or dialog boxes for planning disk partition operations are **user actions**. User entries are necessary operation parameters on the wizard or dialog box pages.

One user action in Acronis Disk Director Suite enables you to plan a list of partition operations, for example, **calling a wizard** for partition creation or resizing. (You can easily verify your actions by looking at the **Pending Operations when** the wizard finishes its work.)

You can also create a partition by selecting **Disk → Create Partition**. This requires a list of actions to be performed (enter a label, select partition type, file system, size and location), resulting in the creation of a single partition create operation only.

The difference between user actions and partition operations should be kept in mind if you wish to **undo user actions**.

Any user action in Acronis Disk Director Suite can be undone or redone before committing the operation. To undo a user action:

- Select **Operations → Undo** from the main menu (or press `Ctrl+Z`)
- Click the **Undo Last Action** toolbar button

To redo a user action:

- Select **Operations → Redo** from the main menu (or press `Ctrl+Y`)
- Click the **Redo Last Action** toolbar button

As user actions result in creating pending partition operations, as mentioned above, undoing them results in canceling one or more partition operations. And conversely, redoing a user action results in the addition of one or more pending operations.

Depending on the situation, undoing an action may cancel a pending operation or undo changes of an existing operation (see 2.4.5 «Modifying pending operations»).

Similarly, redoing an action might add a pending operation to the list again or redo a change of a pending operation parameter.

You can undo user actions **one at a time or all at once** by selecting **Operations → Undo All**. Similarly, you can redo user actions (along with the corresponding graphical representation of partition reconfiguration) one-by-one or all at once by selecting **Operations → Redo All.**

2.4.7 Wizard operations

Pending partition operations created by Acronis Disk Director Suite wizards differ in that a user must provide a list of operation **parameters** to perform them. Each parameter is entered on a separate wizard page.

Entering operation parameters, you change wizard pages using `Back` and `Next` buttons until you reach the **Preview** page with the `Finish` button.

On the **Preview** wizard page, you can click `Back` to return and change any operation parameter.

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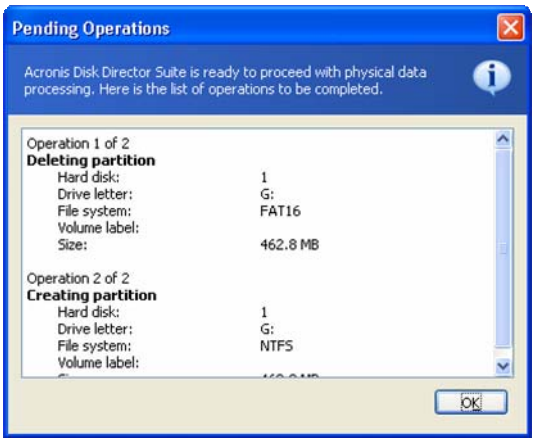
After clicking `Finish` on the last wizard page:

- The new partition structure is graphically represented in the Acronis Disk Director Suite main window
- The wizard creates a list of pending operations; you can see it by selecting **Operations → Show**



Remember that **no** actions are performed on your disks when the wizard finishes working! If you are sure that the new structure is suitable, select **Operations → Commit** or click **Commit Pending operations. Wizard**-created pending operations will then be performed **at this time**.

Before you select **Operations → Commit** or click **Commit Pending operations**, you can undo your actions (calling a wizard) and wizard-created pending operations in the usual way (selecting **Operations → Undo** or pressing `Ctrl+Z`) or clicking **Undo Last Action**.

Acronis Disk Director Suite shows the wizard and its results as a user action by creating **the list of operations**. Any pending actions can be **fully** undone by any of the mentioned methods, i.e. pressing **Undo Last Action** will undo a user action and **all operations** planned by the wizard.

2.5 Protecting Acronis Disk Director Suite With A Password

You should always be aware of possible unauthorized access to your data. To protect your hard disk, partition, applications and data, Acronis Disk Director Suite provides password protection.

If you need to protect Acronis Disk Director Suite with a password:

1. Select **Disk → Set Password.**

2. Enter a password in the **New Password** and **Confirm New Password** fields in the **Set Password** window.

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3. Click OK to enable password protection.

After you run the program, you'll be prompted to enter a password in the **Password Protected** window:

If you enter a wrong password, you'll be asked to re-enter it. Clicking `Cancel` will close the program.

If you need to change the password:

1. Select **Disk → Set Password.**
2. Enter the old password in the Old Password field and the new password in the **New Password** and **Confirm New Password** fields in the **Set Password** window.
3. Click OK to enable password protection.

If you protect Acronis Disk Director Suite with a password and forget it, you will have to uninstall Disk Director Suite (see 1.5 Removing Software), and install it again.

2.6 Viewing logs

Acronis Disk Director Suite allows users to view its working logs. They provide information about partition operations, including reasons for failure, if any.

To invoke the log window, select **Show log** on the toolbar or from the **Tools** menu.

The log browsing window contains two panes: the left one features the log list, while the right one shows selected log contents.

The left panel can contain up to 50 logs. If there are more, you can browse the list using the **More** and **Less** buttons with the left and right arrows.

To delete a log, select it and click **Delete**.

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If any step was terminated by an error, the corresponding log will be marked with a red circle with a white cross inside.

The right window features the list of steps contained in the selected log. The three buttons to the right control message filters: the white cross in the red circle filters error messages, the exclamation sign in a yellow triangle filters warnings, and the “i” in the blue circle filters information messages.

To select columns (step parameters) to display, right-click the headers line or left-click the **Choose Details** button. Then check the desired parameters.

To sort messages by a particular parameter, click its header (click again to reverse order) or the **Arrange Icons by** button (the second from the right) and select the desired parameter.

You can also change column width by dragging the borders with a mouse.

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Chapter 3. Automatic Partition Operations

The «Automatic partition operations» mode enables you to perform the following typical operations:

- Create a new partition
- Increase partition free space
- Copy a partition
- Recover partitions

These operations are performed with wizards, enabling you to enter operation parameters step-by-step and return to any step as needed. Each parameter is provided with detailed instructions.

For a detailed description of the Recover Partitions Wizard see Chapter 5 «Working with Acronis Recovery Expert».

3.1 Creating A New Partition

You might need a new hard disk partition to:

- Store several **same-type files** — for example, an MP3 collection or video files on a partition
- Store **backups** (images) of other partitions/disks on a partition
- Install a new **operating system** (or swap file) on a partition

Create partition wizard lets you create a partition of any type (**Active**, **Primary** or **Logical**), select a file system, label, assign a letter, and other disk management functions.

1. If you need to create a partition:

1. Run the create partition wizard by selecting **Wizards → Create partition** or a similar **Wizards** list item on the sidebar, or by clicking **Create partition** on the toolbar.

2. The wizard will analyze computer disks and partitions. **If the wizard finds unallocated space**, you will see the **Action Selection** wizard page.

It will ask you to select how to create a new partition:

(1) using disk **unallocated space.**

(2) using existing partitions **free space**

Unallocated space is the space not used by any existing partitions. In contrast, partition free space is the space free from any data.

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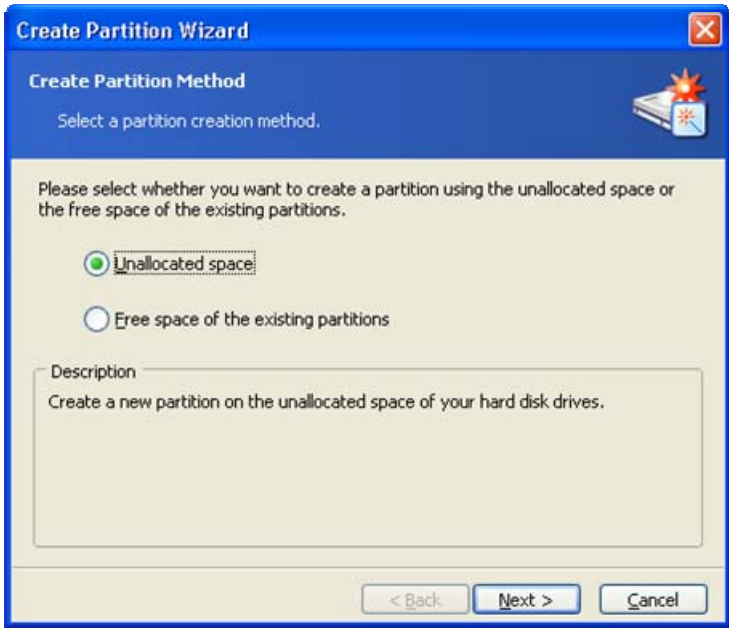

Create Partition Wizard
Create Partition Method
Select a partition creation method.
Please select whether you want to create a partition using the unallocated space or the free space of the existing partitions.
Unallocated space
Free space of the existing partitions
Description
Create a new partition on the unallocated space of your hard disk drives.
< Back
Next >
Cancel

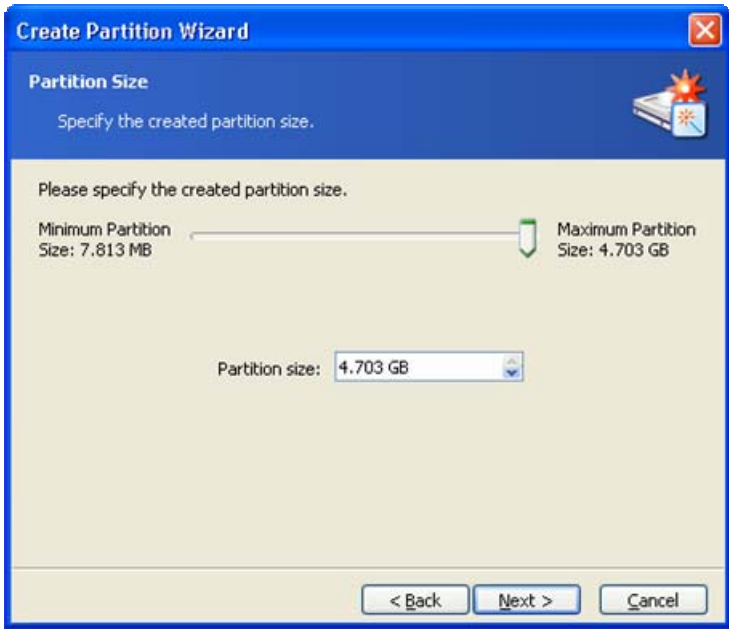
Partition creation method selection window

2. If you want to create a partition using unallocated disk space:

1. Set the switch to **Unallocated space.**
2. The wizard will offer to create a partition on the **largest** unallocated area.
   For example, if you have 5 GB and 12 GB unallocated areas, the wizard will offer to create a partition on the 12 GB area.

If you want to create a partition on the 5 GB unallocated space, you will have to reject the wizard's suggestion and simply select this area and click **Create a new partition**. You can do this in the «Manual partition operations» mode.

3. On the **Partition Size** wizard page, set the partition size.



New partition size window

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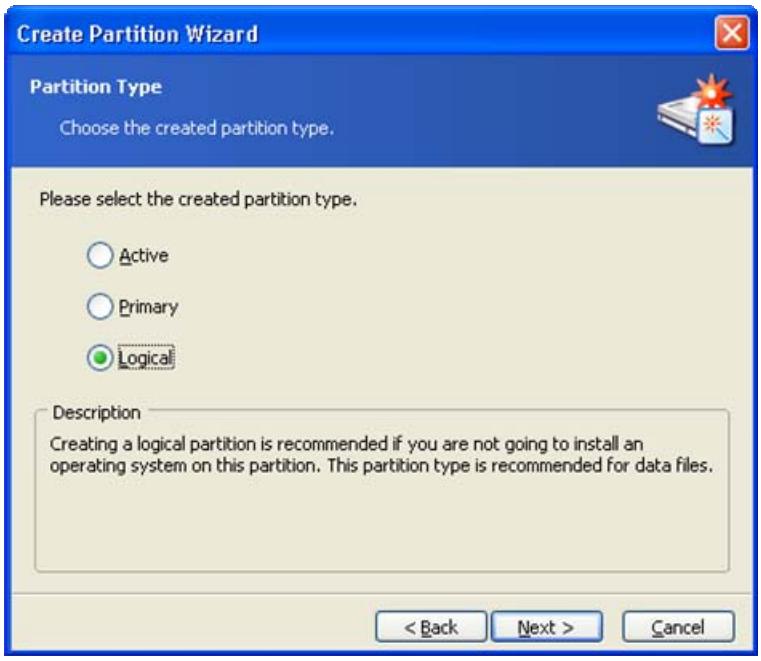
4. On the next wizard page, select partition type — **Active** (Active Primary), **Primary** or **Logical**.
5. Typically **Primary** is selected to install an operating system to a partition. If the partition is for data storage, select **Logical**.
6. Select **Active** if you want to install an operating system on this partition to boot at startup.

Note that if you enter a size of more than 2 GB, you will not be able to use the FAT16 file system on this partition. It will be disabled in the **File System** wizard page.


Create Partition Wizard
Partition Type
Choose the created partition type.
Please select the created partition type.
Active
Primary
Logical
Description
Creating a logical partition is recommended if you are not going to install an operating system on this partition. This partition type is recommended for data files.
< Back
Next >
Cancel

Partition type selection window

A hard disk can contain up to four primary partitions. If they already exist, Active and Primary options will be disabled and you will be able to select only the Logical partition type.

7. On the next **File System** wizard page, select a file system. The wizard will offer you one of the Windows file systems — **FAT16**, **FAT32 or NTFS, —** or **Linux** file systems — **EXT2**, **EXT3**, **ReiserFS**, **Swap** — or to leave the partition **Unformatted**.

More details about the properties of main file systems, the operating systems, and disks are provided in the A.9 «File System Main Specifications» appendix.

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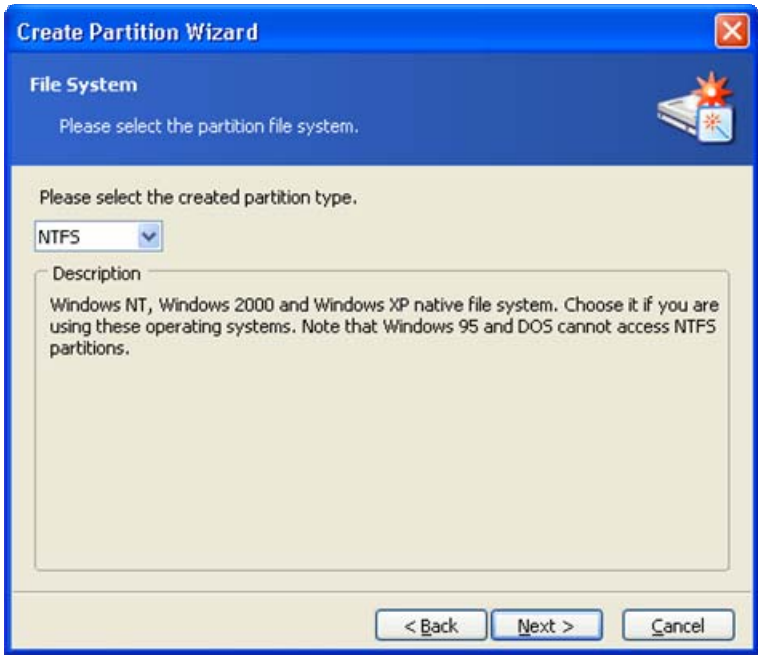
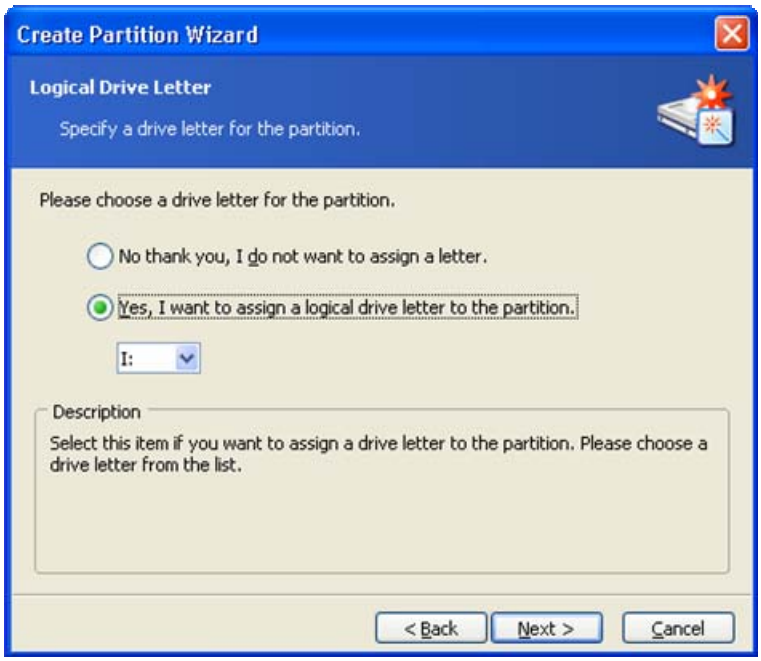

Create Partition Wizard
File System
Please select the partition file system.
Please select the created partition type.
NTFS
Description
Windows NT, Windows 2000 and Windows XP native file system. Choose it if you are using these operating systems. Note that Windows 95 and DOS cannot access NTFS partitions.
< Back
Next >
Cancel

Partition file system selection window

Selecting a partition file system results in partition formatting, i.e. creating partition **data storage structures** – boot record, file allocation table, etc.

8. On the next wizard page, you will be asked to select a partition letter.


Create Partition Wizard
Logical Drive Letter
Specify a drive letter for the partition.
Please choose a drive letter for the partition.
No thank you, I do not want to assign a letter.
Yes, I want to assign a logical drive letter to the partition.
I:
Description
Select this item if you want to assign a drive letter to the partition. Please choose a drive letter from the list.
< Back
Next >
Cancel

Partition Logical Drive Letter selection window

At startup, an operating system assigns letters (C:, D:,...) to partitions. These letters are used by applications and the operating system to locate files on partitions. For example, C:\Program Files\Acronis\Disk Director\DiskDirector.exe. See also Appendix C «Glossary» — «Letter (of a drive, partition)».

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Hard disk partitions are not only assigned letters, but are also numbered. That means some operating system partitions are assigned letters and numbers, in others, only numbers.

Create-, delete- and move-partition operations, as well as hiding/unhiding a partition and direct letter change may result in problems running applications, opening files (as some shortcuts become unusable) or booting an operating system.

Therefore, when performing partition operations, you must be careful and remember that each operating system works differently with partition letters. Each OS has its own partition letter assignment rules.

Windows 98/Me

Windows 98/Me assign partition letters **automatically** in fixed order, according to these rules:

- **Partition** letters start from C: and continue until Z:. The C: partition is considered system, i.e. used for OS startup.

Note that these OS cannot recognize all partitions, but only **1** (FAT12), **4 and 6** (FAT16), **11** (FAT32), **12** (FAT32 LBA) and **13** (FAT16 LBA) **types**. File system type is determined not by partition type, but by its contents. Partitions of other types are passed (no letters are assigned to them).

- The first **primary active** partition found on the first hard disk is assigned C:. If there's no such partition, C: is assigned to the first suitable primary partition
- Similarly and consecutively, one of the **primary** partitions from other hard disks is considered. They are assigned D:, E:, etc. (If there is no suitable partition found on the first disk, then C:, D:, etc. are assigned.)
- Next, all suitable **logical** partitions are considered in the sequence order on the first, second, third, etc. hard disks. They are assigned E:, F:, G:, for example
- Finally, in order, letters are assigned to **all remaining** suitable **primary partitions** of the first, second, third, etc. disks.

Partition operations in the mentioned operating systems may result in problems running applications, opening files and other problems if letter assignments change.

Windows NT/2000/XP

Windows NT/2000/XP operating systems' **initial letter assignment** is done **automatically**: similar to Windows 98. Windows NT 4.0 does not support FAT32, but assigns letters to such partitions.

Please note that letter order in these operating systems can differ depending on the number of hard disks and other disk drives recognized by the BIOS.

All these operating systems enable you to **change** initially assigned **letters**. Partition create, delete and move operations do not affect letters assigned to other partitions. Assigning a partition a new letter or hiding it will prevent only its applications and files from running or opening. Other partitions will not be affected by these operations.

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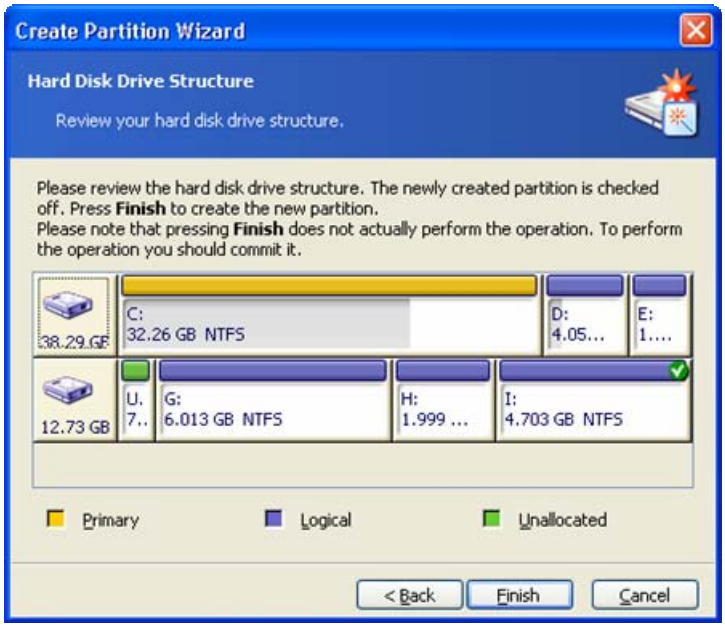
OS startup problems may appear if you directly change the letter assigned to the system partition or a partition with PAGEFILE.SYS swap file.

Hard disk partition letter assignment in various operating systems is further explained in all guide chapters where the partition operations might affect PC operation or booting.

9. On the next page, you can enter an optional partition label that will enable you to distinguish one created partition from another.

In Windows, a partition label is shown in the Explorer disk and folder tree; for example, WIN98(C:), WINXP(D:), DATA(E:), etc. WIN98, WINXP and DATA are partition labels. See also Appendix C «Glossary» — «**Label**».

10. The last wizard page **graphically** shows you the new disk partition structure, including those just created.



Created partition in the disk partition structure

Clicking `Finish` on this page will make Acronis Disk Director Suite create a pending **operation** for new partition creation, (your actions may only modify an existing operation. See 2.4.5 «Modifying pending operations»). The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

More details about the `Finish` command results are provided in 2.4.7. «Wizard operations».

3. If you want to create a new partition using other partition free space:

1. On the **Action Selection** wizard page, set the switch to **Free space of the existing partitions.**

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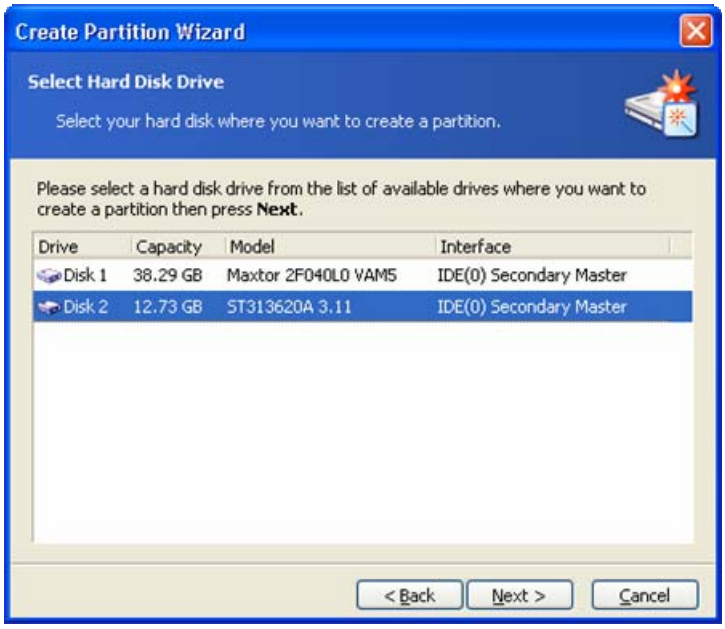
Create Partition Wizard
Create Partition Method
Select a partition creation method.
Please select whether you want to create a partition using the unallocated space or the free space of the existing partitions.
Unallocated space
Free space of the existing partitions
Description
Create a new partition using both the unallocated space and the free space of the existing partitions. The existing partitions can be resized if necessary to give the space to the created partition.
< Back
Next >
Cancel

2. On the **Select Hard Disk Drive** wizard page, select a **disk** on which to create a partition.



Partition disk selection page

Note that this wizard page represents **physical** disks actually connected to your PC. The next page shows **logical** disks (or partitions) on the selected physical disk. See also Appendix C «Glossary» — «**Physical disk**», «**Logical disk**».

3. On the next **Select Partitions** wizard page, select the disk partition(s) **whose space you want to use** to create a new partition.

This means that if these partitions have free space, their size can be reduced. As a result, the freed space will be automatically considered as unallocated (not used by any partitions). A new partition can be created in this space.

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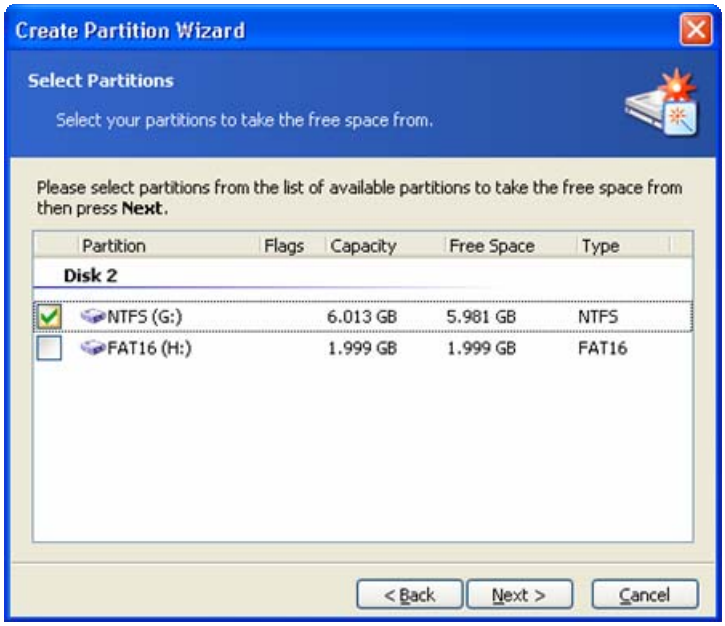
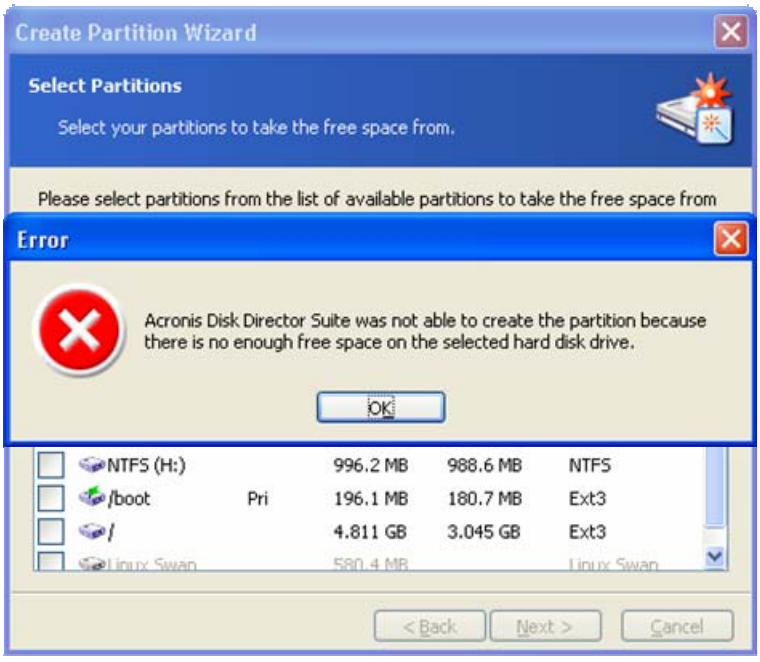


The window of existing partition selection to create a new partition

By creating a partition using the free space of other partitions, Acronis Disk Director Suite can collect it in such a way that the final partition size is not smaller than 110% of data-occupied space.

When creating a partition with the switch set to **Free space of the existing partitions,** you provide a small partition size. If it is possible to create it using unallocated disk space, the partition will be created this way; the existing partitions will not be resized. If a partition cannot be created using unallocated space only, then the deficit will be taken from existing partitions.

If you do not select a partition to take space from on the **Select Partitions** wizard page and there is no unallocated disk space, you will see an error message:



Error message of deficient disk space for partition creation

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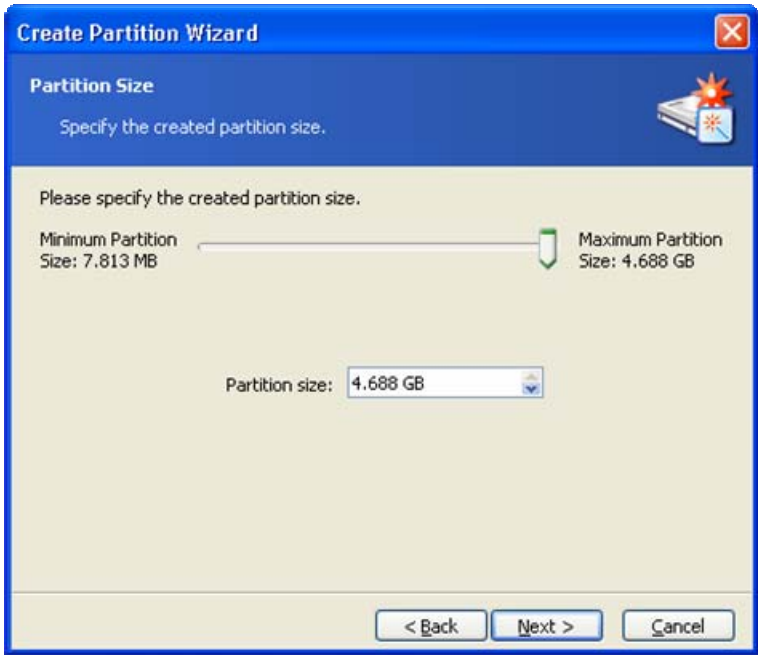
In this case, you will have to return to the previous wizard page and select a different partition from which to take the necessary space.

4 On the **Partition Size** wizard page, enter the size of the created partition (the wizard automatically determines minimum and maximum partition sizes).



Created partition size window

5 The next wizard pages provide partition type, file system, letter (if you work in Windows NT/2000/XP), and optional labeling.

Further actions for partition creation are the same as described in 3.1 «Creating A New Partition» section.

Clicking `Finish` on the last wizard page allows Acronis Disk Director Suite to create a **pending operation list** for new partition creation (these actions may only modify an existing operation. See 2.4.5 «Modifying pending operations»).

The list will include not only the operation of partition creation itself, but also operations of partition resizing for creating a new partition.

If you want to create a new partition and there is no free space on disks:

Run the create partition wizard, by clicking **Create a new partition**.

You will immediately see the **Select Hard Disk Drive** wizard page, passing the **Action Selection** page.

Further actions for partition creation are the same as described in 3.1 «Creating A New Partition» section.

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Click `Finish` on the last wizard page to allow Acronis Disk Director Suite to create a **pending operation list** for new partition creation (these actions may only modify an existing operation. See 2.4.5 «Modifying pending operations»).

3.2 Increasing Partition Free Space

You might need to increase partition free space in some cases:

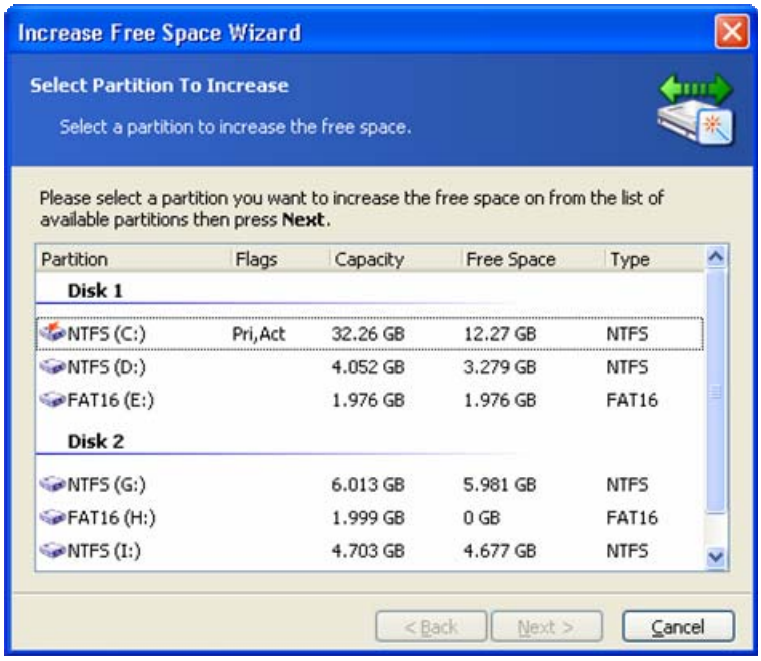
- There is no free space to install new applications or store data
- Some programs, like defragmenters, could stop working correctly if partition free space is smaller than a certain value

Reducing system partition free space below a certain value might cause operating system problems. The Increase free space wizard will enable you to enlarge a partition using other partitions' free space. If there is not enough free space in other partitions, it can use unallocated disk space.

If you need to increase partition free space:

1. Run the Increase free space wizard by selecting **Wizards → Increase free space** or a similar item in the **Wizards** sidebar list or by clicking **Increase free space on a partition** on the toolbar.

2. On the **Select Partition To Increase** wizard page, select a partition that you want to enlarge.



Selecting a partition to increase free space

3. On the **Select Partitions** wizard page, select a disk partition whose space will be used to increase the selected partition.

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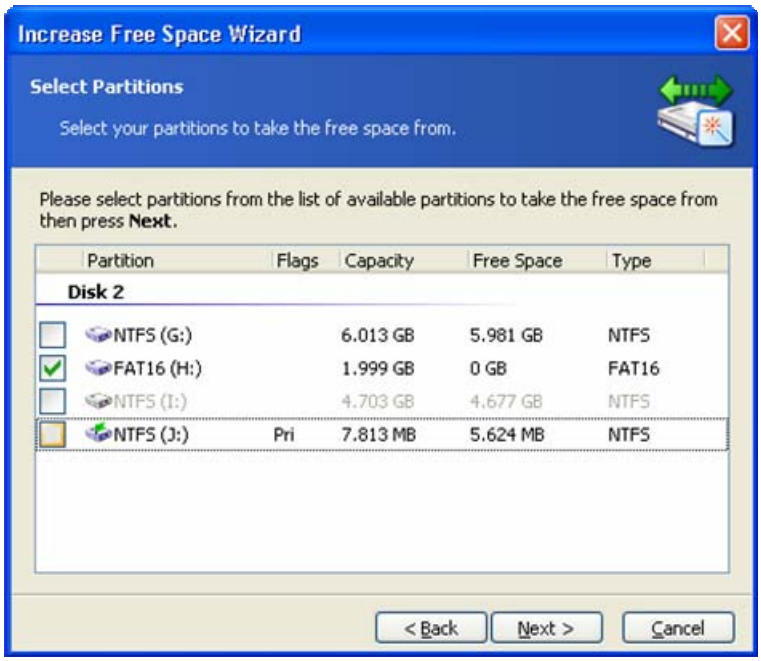
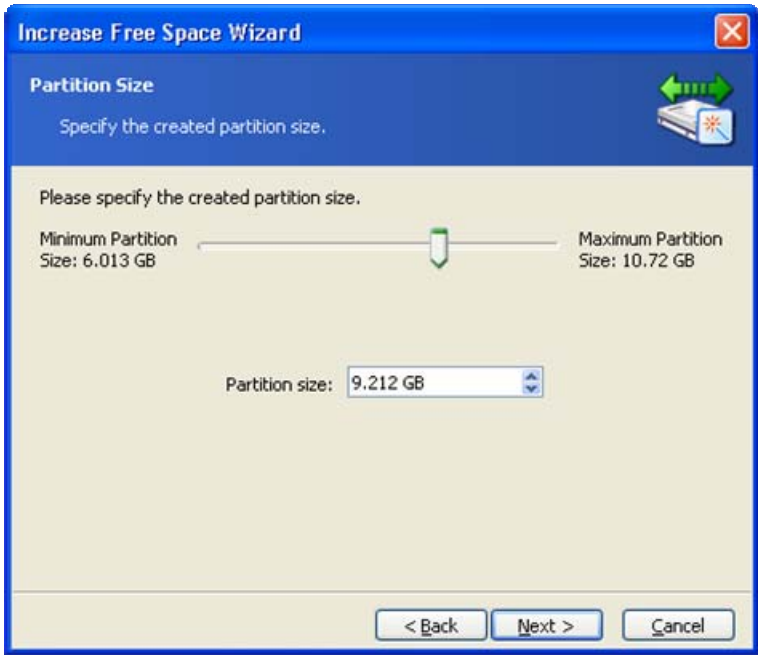
«Enlarging a partition at the expense of another partition» is described above: see 3.1 «Creating A New Partition».



Selecting a partition to use to increase free space

4. On the next wizard page, you will see the maximum size available for the selected partition. You must select the size yourself.



Entering the size to increase partition free space

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Note that although selected partition size is increased at the expense of other partition space, unallocated space also will be used if needed. Unallocated space is automatically considered to be the maximum partition size.

5. In the last **Preview** wizard window, you will see a **graphical** representation of the new partition structure, including the resized partition.

Clicking `Finish` on the last wizard page will allow Acronis Disk Director Suite to create the **pending operation list** for partition resizing (your actions may only modify an existing operation. See 2.4.5 «Modifying pending operations»).

The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

Similar to creating a new partition (see 3.1 «Creating A New Partition»), Acronis Disk Director Suite considers the results of partition free space increase as a single complex operation that can be undone only as a whole.

3.3 Copying Partitions

Having copied a partition, you get the duplicate of all its data. Partition copy can be used:

- As a partition backup (or rather as a data backup)
- A system partition backup is advised if you want to upgrade the existing operating system
- To quickly move all data from an old disk to a new disk

We again recommend our backup solution — Acronis True Image. It enables you to create a backup (image) of a partition and/or entire hard disk in a compressed archive file, while allowing comments and password protection. See http://www.acronis.com/products/trueimage/).

The copy partition wizard will let you create a partition copy on the selected disk space. It can be created on unallocated disk space or at the expense of existing partition space, inserted between other partitions or resized after comparison with the original. It can also change the type or file system and assign a label or a letter if needed.

If you need to copy a partition:

1. Run the wizard by selecting **Wizards → Copy partition** or a similar item in the Wizards sidebar list, or by clicking Copy a partition on the toolbar.
2. On the Select Partition To Copy wizard page, select a partition to copy.

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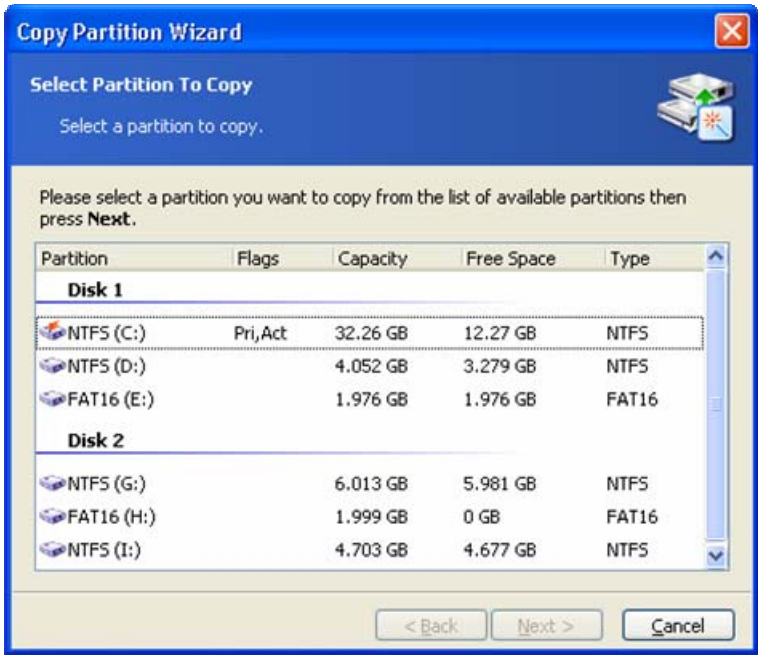
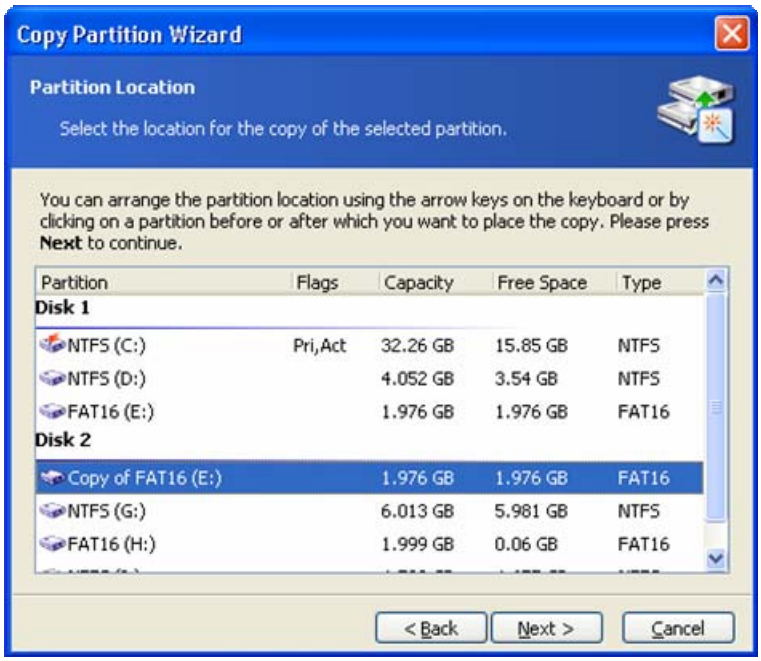


Selecting a partition to copy

3. On the next Partition Location wizard page, a record of copied partition parameters will be created.



The page for selecting a disk location for partition copy

You will have to select a copy location on one of the disks, among existing partitions. To make your selection, click **before or after a partition** to mark where you want to locate the copy.

In this example, the copy will be located **before** the PROGRAM(H:) partition in the figure below.

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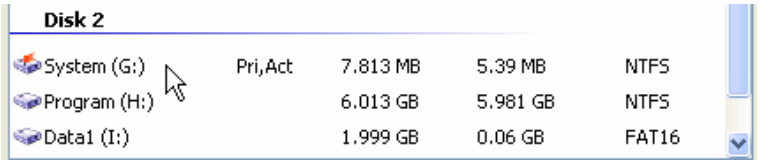
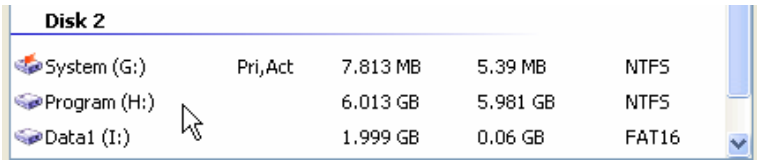
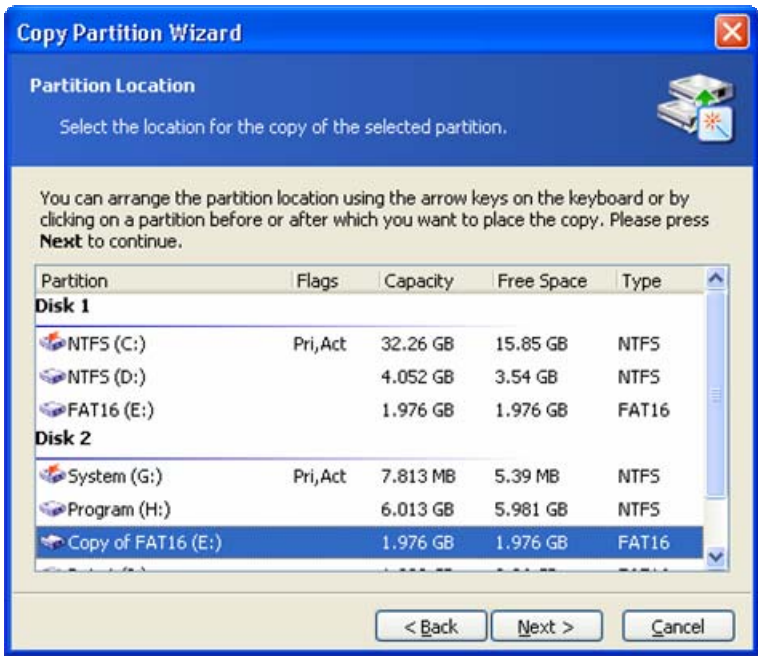


The copy will be located **after** the PROGRAM(H:) partition in the figure below.



The figure below shows the result of locating a partition copy after clicking **after** the PROGRAM(H:) partition.


Copy Partition Wizard
Partition Location
Select the location for the copy of the selected partition.
You can arrange the partition location using the arrow keys on the keyboard or by clicking on a partition before or after which you want to place the copy. Please press Next to continue.
Partition Flags Capacity Free Space Type
Disk 1
NTFS (C:) Pri,Act 32.26 GB 15.85 GB NTFS
NTFS (D:) 4.052 GB 3.54 GB NTFS
FAT16 (E:) 1.976 GB 1.976 GB FAT16
Disk 2
System (G:) Pri,Act 7.813 MB 5.39 MB NTFS
Program (H:) 6.013 GB 5.981 GB NTFS
Copy of FAT16 (E:) 1.976 GB 1.976 GB FAT16
< Back
Next >
Cancel

You can locate a copy anywhere on your disk(s). The copy partition wizard will automatically perform all necessary operations, even if it has to resize or move other partitions.

1. The selected disk might lack space for a copy. Nevertheless, you can copy a partition by selecting another partition whose space will be partly used. This can be done in the Select Partitions window.

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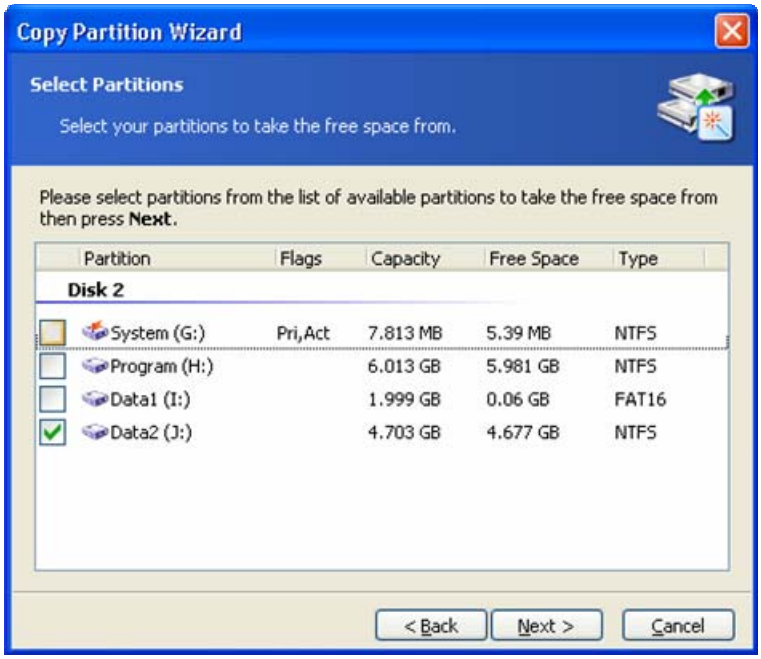
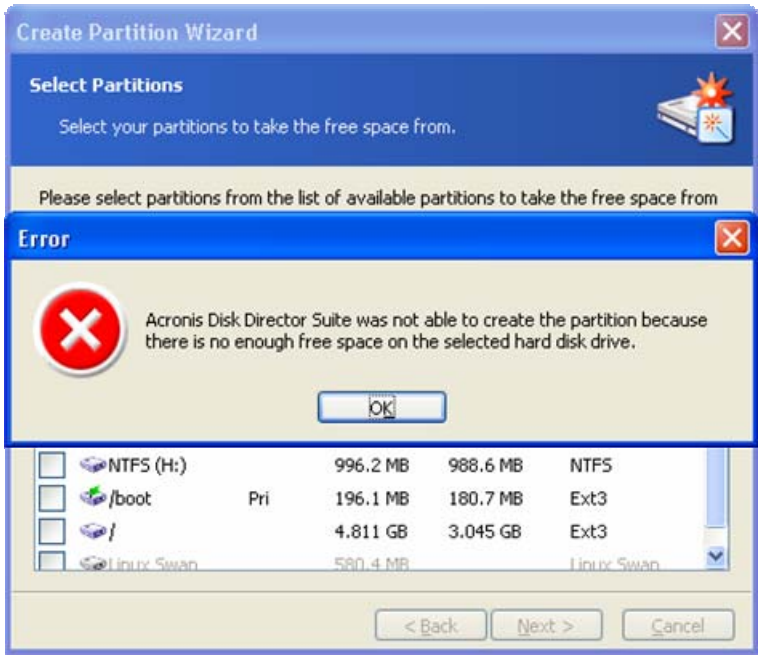


The page to select a partition, which will be partly used for a copy location

If you do not select a partition to be partly used as the copy location on the **Select Partitions** wizard page and there is not enough unallocated disk space, you will see an error message:



Error message showing not enough disk space for a partition copy

In that case, the wizard will prompt you to select a partition from which to take some space.

If there is not enough space, the partition will not be copied!

2. On the next Partition Size wizard page, you can provide a desired size. The wizard will automatically determine the minimum and maximum copy size.

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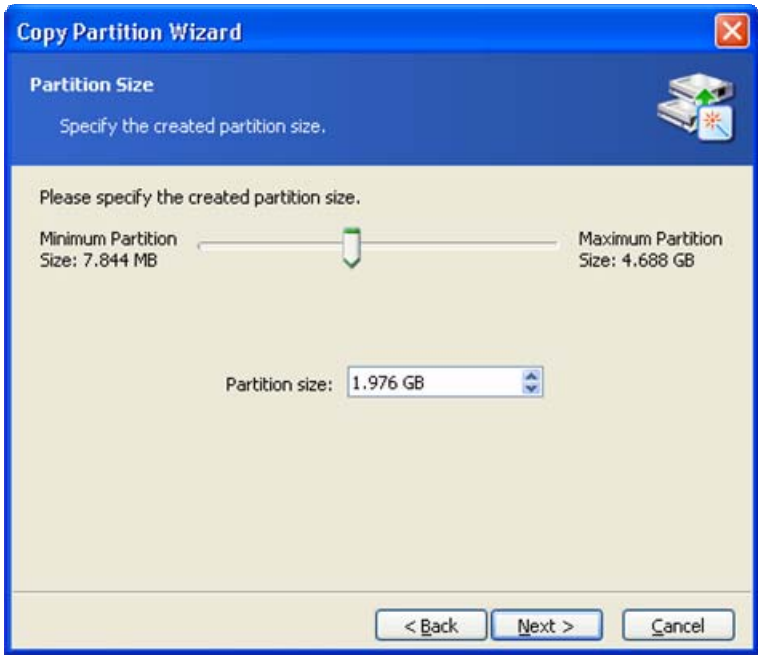

The page for partition copy size selection

The minimum copy size is determined by the data area size of a copied partition. The maximum size is determined by the available disk space. It includes the space taken from a partition and unallocated disk space.

By copying a partition at the expense of existing partition free space, Acronis Disk Director Suite can take the partition space to make sure that partition size is not smaller than 110% of data-occupied space.

3. On the next Partition Type wizard page, you can select partition copy type: Active, Primary and Logical.

As a rule, **Primary** is selected if a partition contains an operating system. If a partition is intended for data storage, you should select **Logical**.

Select **Active** if you want to boot the partition's operating system at startup.

By copying a partition at the expense of existing partition free space, Acronis Disk Director Suite can take the partition space to make sure that partition size is not smaller than 110% of data-occupied space.

Further actions for copying a partition are the same as described in sections 4-7 of 3.1 «Creating A New Partition».

Copying a partition in Windows 98/Me and assigning it a letter can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. For a detailed discussion of partition letter assignment rules for various operating systems, see 3.1 «Creating A New Partition».

Clicking `Finish` on the last wizard page will allow Acronis Disk Director Suite to create the **pending operation list** for copying a partition (your actions may only modify an existing operation. See 2.4.5 «Modifying pending operations»).

The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

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Chapter 4. Manual Partition Operations

Unlike the «Automatic partition operations» mode (see 2.1), the «Manual partition operations» mode is intended for experienced users only, and offers much wider operation lists. Manual operation parameters are entered in the dialog boxes.

To switch to the «Manual partition operations» mode, select **View -> Manual mode**.

4.1 Main Partition Operations

Main hard disk partition operations include the typical, **most frequently used** operations of partition creation (selecting a type, file system, formatting, etc.), assigning label and letter partition, resizing, relocating, clearing, deletion, etc.

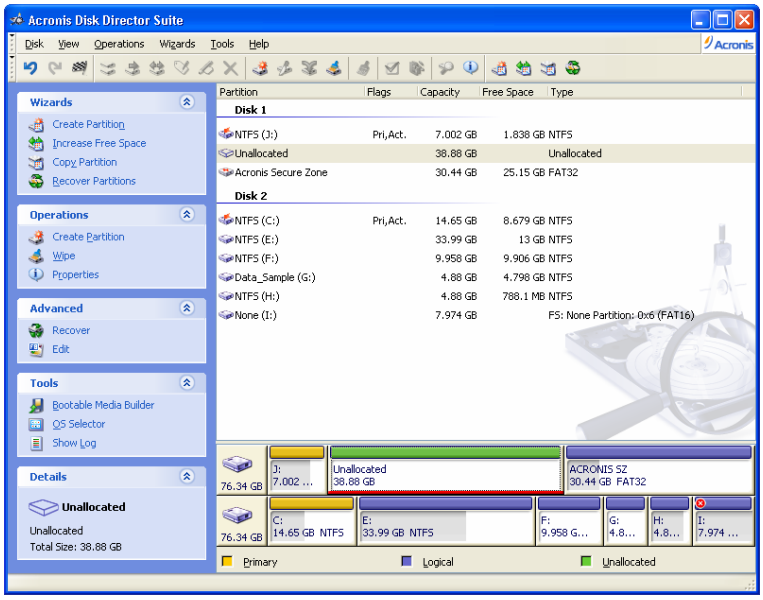
4.1.1 Creating partitions

If there is unallocated space on a disk, you can create a partition using manual disk operations.

Note that the Create partition wizard mentioned above can create a partition using both unallocated disk space and the space of existing partitions (see 3.1 «Creating A New Partition»). It will enable you to create a partition on unallocated space only. If there is no such space, it should be provided by resizing and moving existing partitions.

If you need to create a disk partition:

1. Select hard disk and unallocated space in the Acronis Disk Director Suite main window. The **Create partition** button will become available on the toolbar, and the **Create Partition** operation on the sidebar and in the context menu.



Selecting unallocated disk space

2. Select **Disk → Create partition** or a similar item in the **Operations** sidebar list, or click **Create partition** on the toolbar.

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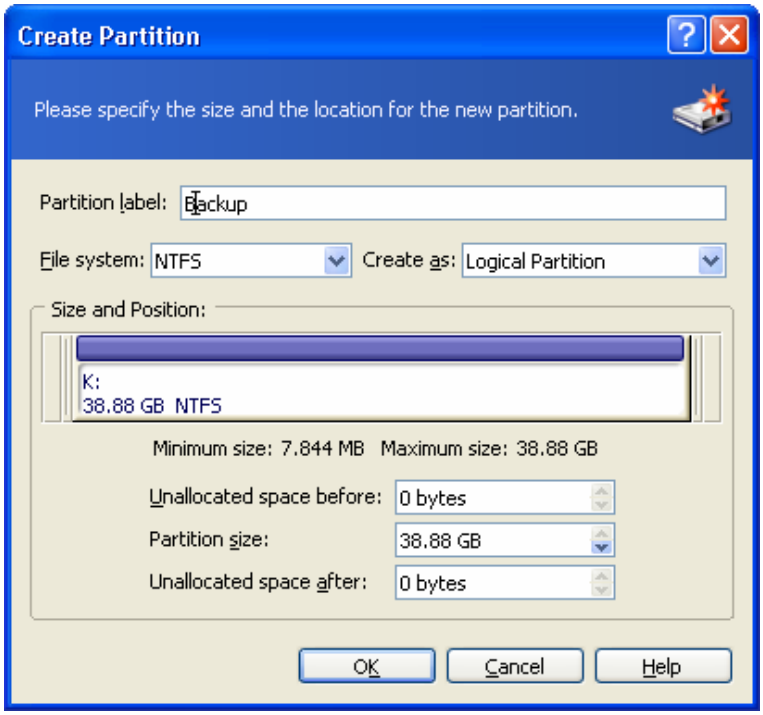
3. In the **Create Partition** window, enter a partition label and select a file system and partition type (**Primary** — **Logical**) from the list; you can also enter partition size and location using a mouse or by direct input to **Partition size**, **Unallocated space before** (and **Unallocated space after**) fields.

As a rule, **Primary** is selected if a partition is to contain an operating system. If a partition is meant for data storage, **Logical** should be selected.



Created partition parameters window

4. By clicking OK, you'll add the pending operation of new partition creation.

The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

Creating a partition in unallocated disk space in Windows 98/Me can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

4.1.2 Copying a partition to unallocated disk space

The reasons for copying a partition were discussed above (see 3.3 «Copying Partitions»). Partition copy can be used:

- As a partition backup (or rather a data backup)
- As a system partition backup if you want to upgrade the existing operating system
- To quickly move all data from the old disk to the new

If you need to copy a partition:

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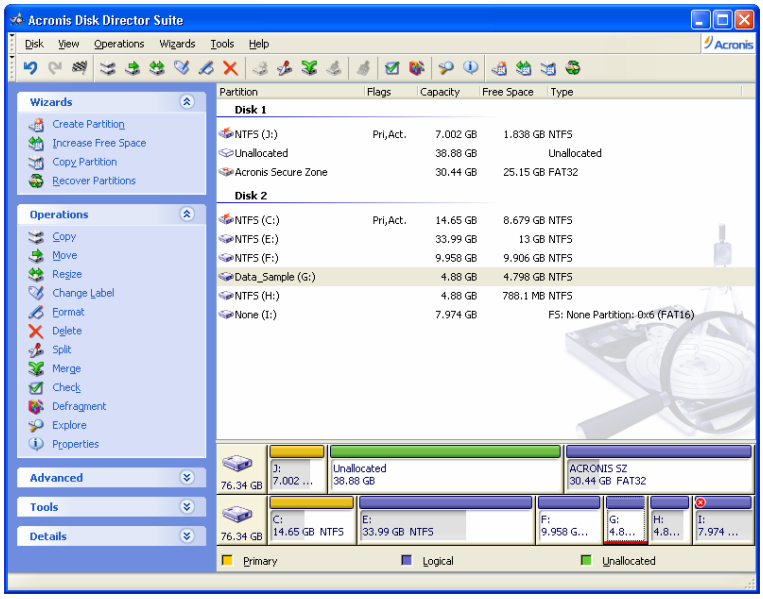
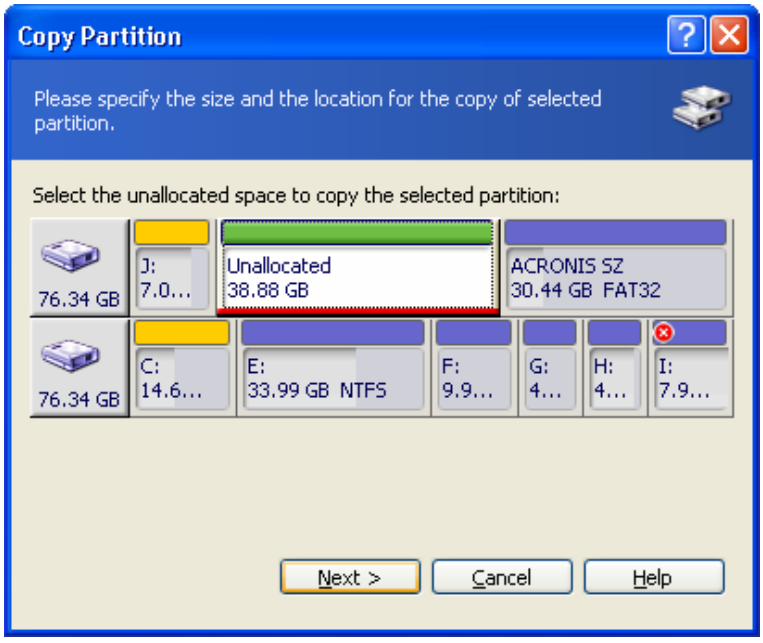
1. Select a hard disk and a partition to copy.



Selecting a partition to copy

2. Select **Disk → Copy** or a similar item in the **Operations** sidebar list or click **Copy the selected partition to another free space** on the toolbar.

3. Acronis Disk Director Suite will automatically compare the size of a copied partition and disk free space as shown in the **Copy Partition** window.



Free space available for copying

Note that the unallocated space is smaller than copied partition size, but its data area is smaller than unallocated space. Therefore copying is possible.

If there is not enough free space to copy a partition on a hard disk, no unallocated space will be available for selection.

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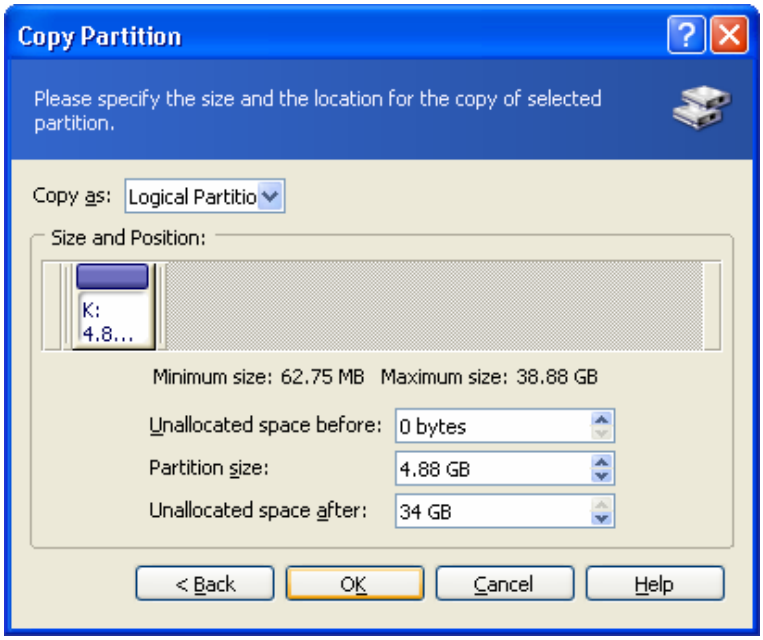
4. Select the unallocated disk space to copy a selected partition to it.
5. In the next wizard page, enter partition copy type (**Logical** — **Primary**), size and location.

While copying a partition, you might have to change its type. For example, you have to copy a primary partition, but there are already four primary partitions on the disk. You will be able to copy it only as a logical partition. If you need to restore the primary partition from a copy, you will be able to change its type again.



Entering partition copy parameters

The size and location of a partition copy can be provided with a mouse or by entering data into the **Unallocated space before**, **Partition size** (and **Unallocated space after**) fields.

6. By clicking OK in the **Copy Partition** wizard, you'll add the pending operation of partition copying and location (your actions may only undo or modify already existing operation; see 2.4.5 «Modifying pending operations»).

The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

Copying a partition in Windows 98/Me and assigning it a letter can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

4.1.3 Moving a partition to unallocated disk space

You might need to move a partition to:

- Change order of letters assigned by operating system

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For example, Windows 98/Me, unlike Windows NT/2000/XP, does not let users assign random letters to partitions, so you must move a partition to assign it the necessary letter.

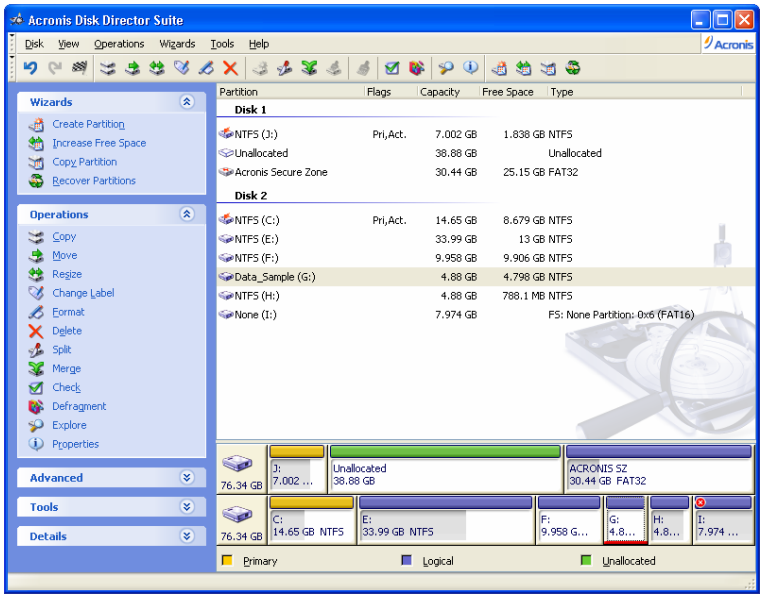
- Work with some older OS (MS-DOS, Windows NT 4.0), that can boot only from binary partitions located in the beginning of the disk
- Speed up partition operations

For example, you might have a special partition for a swap file. If you move this partition closer to the beginning of a disk, OS might work much faster with it.

- Change partition configuration

If you need to move a partition to unallocated disk space:

1. Select the hard disk and **partition** to move.



Selecting a partition to move

2. Select **Disk → Move** or a similar item in the **Operations** sidebar list or click **Move the selected partition to another free space** on the toolbar.

3. Acronis Disk Director Suite will automatically compare moved partition size and available free space, indicating it in the **Move Partition** window.

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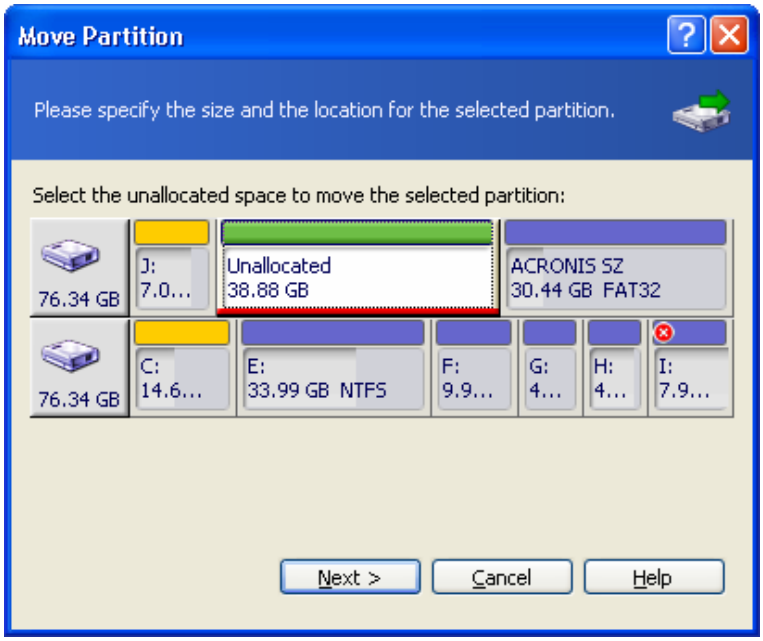

Unallocated space available for partition moving

Note that the unallocated space is smaller than moved partition size, but its data area is smaller than unallocated space. Therefore, moving the partition with its data intact is possible.

If there is not enough free space to copy a partition on a hard disk, no unallocated space will be available for selection.

4. Select free space to move the selected partition to.
5. On the next wizard page, select the type of **moved** partition (**Logical** — **Primary**), size and location.

Changing partition type is not as necessary here as with partition copying (see 4.1.2 «Copying a partition to unallocated disk space»). Nevertheless, Acronis Disk Director Suite gives you this added flexibility.

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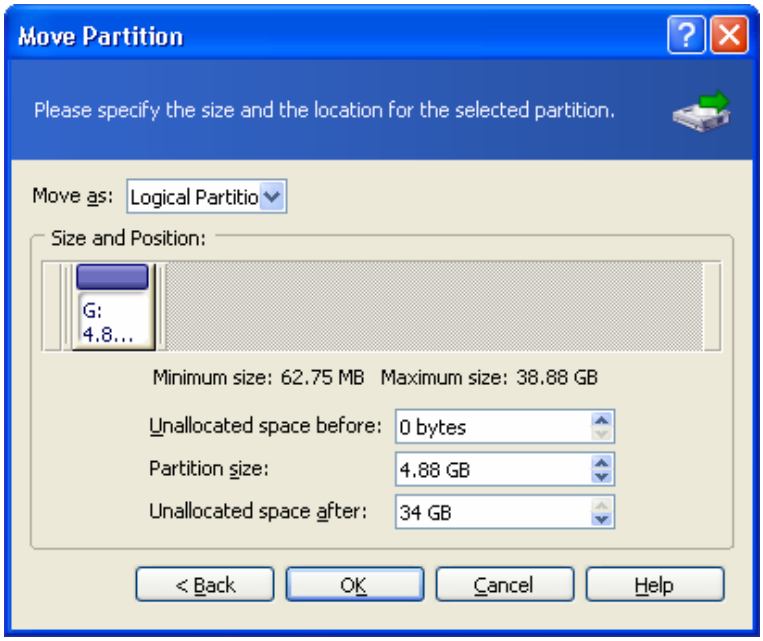

Entering moved partition parameters

The size and location of a partition copy can be provided with a mouse click or by entering data into the **Unallocated space before**, **Partition size** (and **Unallocated space after**) fields.

6. By clicking OK in the **Move partition** window, you'll add a pending operation to partition moving (your actions may only undo or modify already existing operation; see 2.4.5 «Modifying pending operations»).

The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

Moving a partition to unallocated disk space in Windows 98/Me can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

Take special care when moving an **operating system partition** and its boot code location. The OS might stop booting. For example, Windows NT 4.0 and earlier versions limit boot code location to the first 2016 MB.

4.1.4 Resizing and/or moving a partition

You may find that there is not enough free space on a certain partition. For example, maybe it is almost filled with MP3 files. Acronis Disk Director Suite lets you enlarge a partition easily.

Reasons for moving a partition were discussed above (see 4.1.3 «Moving a partition to unallocated disk space»).

If you need to resize and/or move a partition:

1. Select the hard disk and a partition to be resized.

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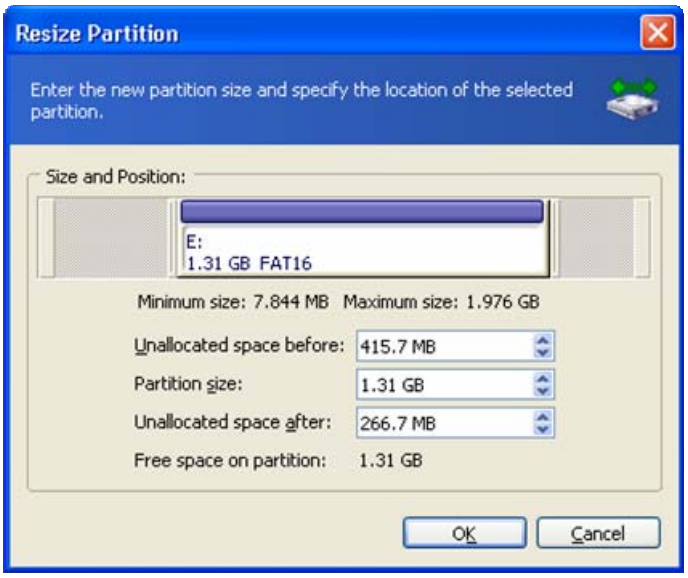
2. Select **Disk → Resize** or a similar item in the **Operations** sidebar list, or click **Resize/move the selected partition** on the toolbar.

3. Resize the partition in the **Resize Partition** window:

   (1) Hold the mouse button and drag a corresponding partition rectangle side until you get the proper size in the **Partition size** field.

   (2) Specify the partition size in the **Partition size** field.


Resize Partition
Enter the new partition size and specify the location of the selected partition.
Size and Position:
E:
1.31 GB FAT16
Minimum size: 7.844 MB Maximum size: 1.976 GB
Unallocated space before: 415.7 MB
Partition size: 1.31 GB
Unallocated space after: 266.7 MB
Free space on partition: 1.31 GB
OK
Cancel

Resize partition window

4. Relocate a partition on a disk by one of the following methods:

   (1) Holding the mouse button and dragging the corresponding partition rectangle left side to resize free space before the partition.

   (2) Having pointed to the rectangle, hold the left mouse button and move a partition as a whole until you get the necessary MB or GB amount in the **Unallocated space before** field.

   (3) Specifying the necessary value in the **Unallocated space before** field.

Acronis Disk Director Suite automatically considers the limitations of file systems and parameters provided. In particular, it won't let you enlarge a FAT16 partition over the maximum 2 GB (4 GB for Windows 98/Me) value.

5. By clicking OK in the **Resize Partition** window, you'll create a pending operation for partition resizing and moving (your actions may only undo or modify an existing operation; see 2.4.5 «Modifying pending operations»).

The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

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Acronis Disk Director Suite features a wizard for performing more complex partition resizing (see 3.2 «Increasing Partition»). Simple partition resizing lets you increase partition size only if there is free (unallocated) space before or after a partition. The wizard lets you perform more complex operations such as increasing partition free space **at the expense of other partitions**.

Moving a partition to unallocated disk space in Windows 98/Me can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

Take special care when moving an **operating system partition** and its boot code location. The OS might stop booting. For example, Windows NT 4.0 and earlier versions limit boot code location to the first 2016 MB.

4.1.5 Splitting partitions

You can split a partition in two, moving the selected folders to the new partition and leaving the rest of the data on the old one. The new partition will have the same file system. This operation can also be used for creating an empty partition from another partition's free space.

There must be some free space on a partition to enable its splitting. The amount of free space necessary for splitting can be calculated as follows:

- Space for the new partition file system – depending on the file system type, maximum 20 MB
- Plus space for the program's housekeeping data – about 25 MB
- Plus 3% of the size of the data being moved to the newly created partition.

With splitting completed, this space will be free again (except for space for the new partition file system) and will be distributed between the two resulting partitions. If there is not enough space on the partition, you will get a message that splitting is impossible.

If you need to split a partition:

1. Select a partition to be split.
2. Select **Disk → Split** or a similar item in the **Operations** sidebar list, or click **Split** on the toolbar.
3. In the folders tree, select folders to be moved to the newly created partition. If you want to create an empty partition, do not select any folders.

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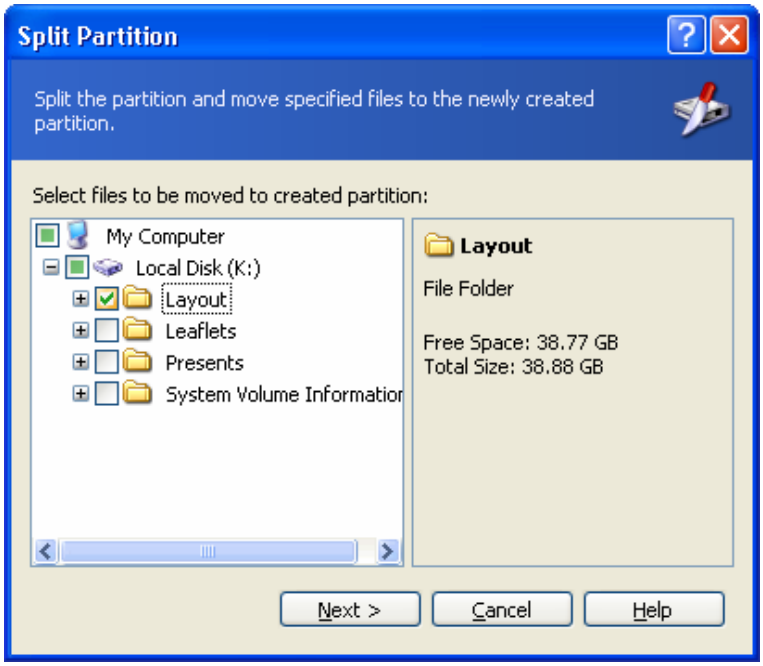
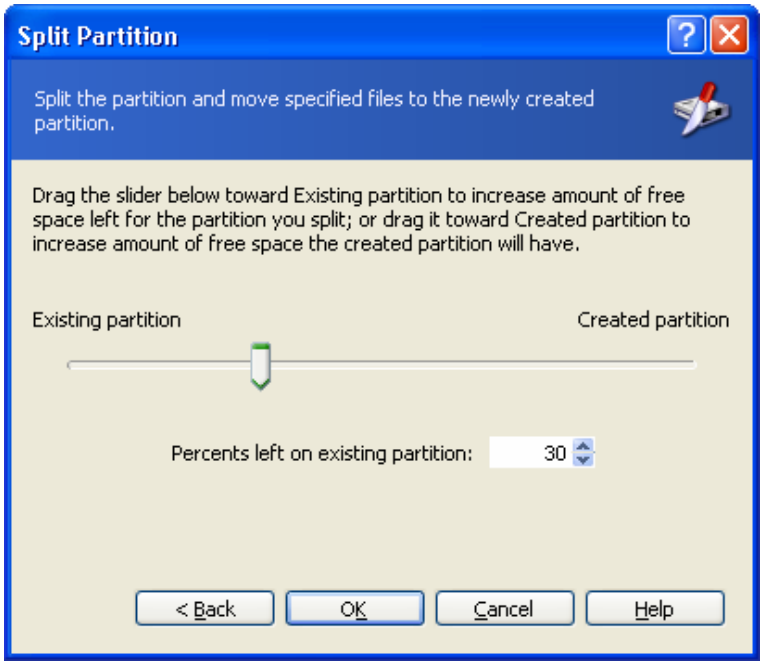


Selecting folders to be moved

4. Distribute the source partition free space between the two resulting partitions.


Split Partition
Split the partition and move specified files to the newly created partition.
Drag the slider below toward Existing partition to increase amount of free space left for the partition you split; or drag it toward Created partition to increase amount of free space the created partition will have.
Existing partition
Created partition
Percents left on existing partition:
30
< Back
OK
Cancel
Help

Distributing the source partition free space

Please keep in mind, that you are distributing not overall partition size, but just free space at this step. The program will automatically count how much space is necessary for the folders being moved to the new partition, and will add the specified free space share to that size. Thus, if you divide free space in equal parts, it does not mean that the two resulting partitions will be equal in size.

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5. By clicking `Proceed`, you'll add a pending operation (your actions may only undo or modify already existing operation; see 2.4.5 «Modifying pending operations»).

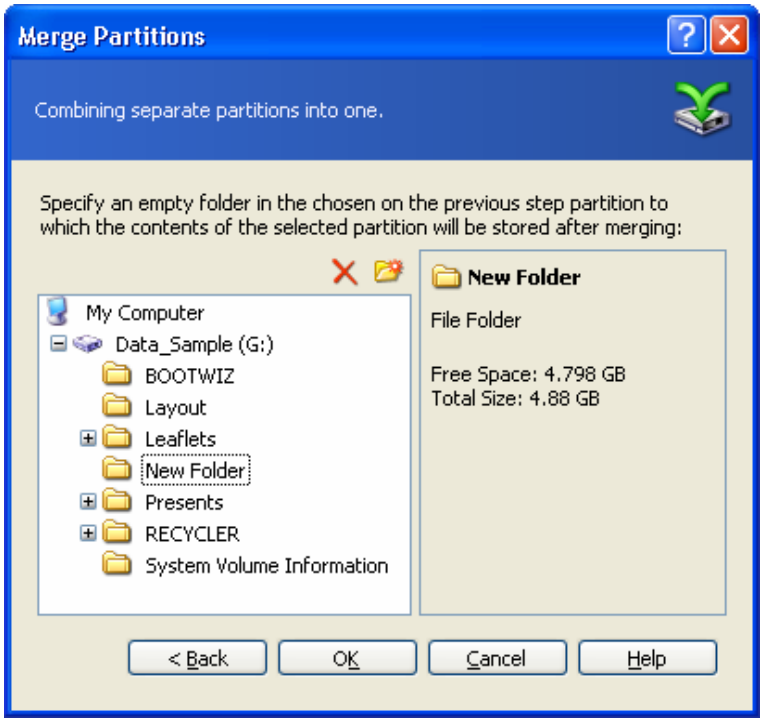
The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

4.1.6 Merging partitions

You can merge two partitions, even if their file systems are different. All data will stay intact and reside on the resulting partition. The resulting partition will have the same file system as the target partition (to which data from another partition will be added).

If you need to merge one partition with another:

1. Select a partition to be merged to the target partition.
2. Select **Disk → Merge** or a similar item in the **Operations** sidebar list, or click **Merge** on the toolbar.
3. Select the target partition.
4. Select a folder on the target partition to which the data from the merged partition will be placed. You can create a new folder, using icons above the folder tree. If the folder already exists, it must be empty.



Selecting the target folder

5. By clicking `Proceed`, you'll add a pending operation (your actions may only undo or modify already existing operation; see 2.4.5 «Modifying pending operations»).

The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

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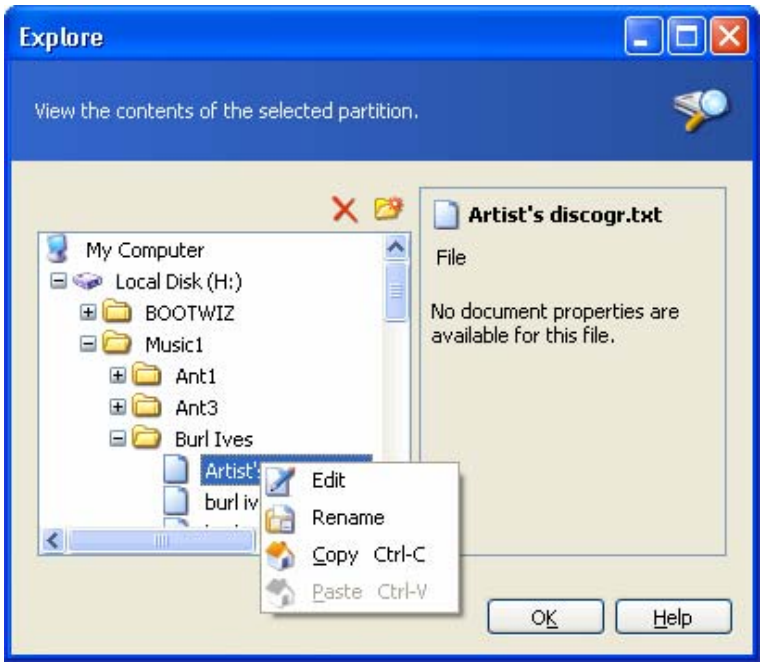
Merging an NTFS partition to a partition with file system not supporting security options (for example, FAT32 partition), will result in loss of security settings (partition ownership data and access permissions). With the opposite action (merging a non-secured partition to the secured one), the target partition security settings will be assigned to the resulting partition.

4.1.7 Exploring partitions

You can explore and manage partition contents before configuring operations on that partition directly from the Acronis Disk Director Suite.

If you need to explore a partition:

1. Select a partition to be explored.
2. Select **Disk → Explore** or a similar item in the **Operations** sidebar list, or click **Explore** on the toolbar.
3. The program displays a folder tree. Now you can explore or manage the partition contents. You can copy, paste, rename and delete files and folders and create folders on the selected partition. To do so, right-click on the file/folder or use icons above the folder tree.



Exploring partition contents

You are also enabled to view or edit text files up to 64 kb in size. To do so, right-click on the file and select **Edit**. To illustrate why it may be necessary, imagine that your operating system failed to boot. You can run Acronis Disk Director Suite from Acronis OS Selector main window (if the program is not installed, start it from bootable disk), and change some critical files contents.

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Acronis OS Selector also allows editing text files (see 7.7.6 “Files”), but only those included into system files list.

The Explore operation shows the real partition contents, read from the disk. If there are some operations pending, like splitting a partition, you will not be able to explore partitions until the operations are committed or canceled. However, operations on folders/files in Explore window are executed immediately.

4. When you’re finished exploring, click **OK**.

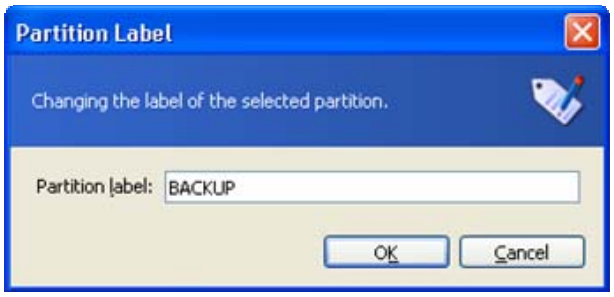
4.1.8 Changing partition labels

The partition label is an optional attribute. It’s a **name assigned to a partition** for easier recognition. For example, one could be called **System** — a partition with an operating system, **Program** — an application partition, **Data** — a data partition, etc.

In Windows, partition labels are shown in the Explorer disk and folder tree: WIN98(C:), WINXP(D:), DATA(E:), etc. WIN98, WINXP and DATA are partition labels. A partition label is shown in all application dialog boxes for opening and saving files. (See Appendix C «Glossary» — «**Label**».)

If you need to change a partition label:

1. Select **Disk → Change Label** or a similar item in the **Operations** sidebar list, or click **Change the selected partition label** on the toolbar.
2. Enter a new label in the **Partition label** window.



Partition label window

3. By clicking OK in the **Partition Label** window, you'll add the pending operation of partition label changing (your actions may only undo or modify an existing operation; see 2.4.5 «Modifying pending operations»).

The new label will be graphically represented in the Acronis Disk Director Suite main window.

4.1.9 Formatting a partition

Acronis Disk Director Suite lets you **logically format** a partition. It includes organizing a file system that supports files and folder data storage.

If you need to format an existing partition:

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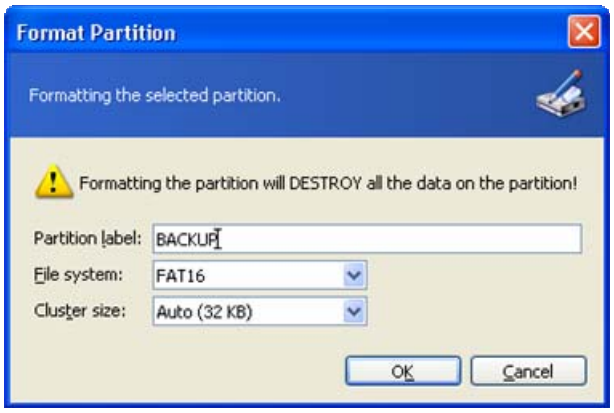
1. Select a disk and a partition.
2. Select **Disk → Format** or a similar item in the **Operations** sidebar list, or click **Format the selected partition** on the toolbar.
3. Enter the partition label in the **Format Partition** window.



Format Partition window

4. Select a file system to be created on a partition after formatting.

Acronis Disk Director Suite supports the following file systems (see A.9 «File System Main Specifications»):

- **FAT16/FAT32, NTFS** — Windows file systems
- **Linux Ext2, Ext3, ReiserFS, Swap** — Linux file systems

5. Select cluster size (Auto, 512 bytes, 1, 2, 4... 64 KB).

Note that:

(1) The smaller the cluster size, the less disk space will be lost (see A.9.2 «FAT16» — Table 3).

(2) The smaller the cluster size, the bigger the file allocation table (FAT). The bigger the FAT, the slower the operating system works with the disk.

(3) If you select Auto, you allow Disk Director Suite to automatically determine the cluster size depending on selected file system and partition size.

6. By clicking OK in the **Format Partition** window, you'll add the pending operation of partition formatting (your actions may only modify an existing operation. See 2.4.5 «Modifying pending operations»).

Attention! Partition formatting destroys all its data, including files and folders! Take special care when performing this operation.

Remember that each operation described must be executed by selecting **Operations → Commit** or clicking **Commit Pending Operations** (see 2.4.4 «Performing pending operations»).

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4.1.10 Deleting a partition

After a partition is deleted, its space is added to unallocated disk space. It can be used for a new partition or to resize an existing partition.

If you need to delete a partition:

1. Select a hard disk and a partition to be deleted.
2. Select **Disk → Delete** or a similar item in the **Operations** sidebar list, or click **Delete the selected partition** on the toolbar.
3. Select the deletion method in the **Delete Partition** window; you can:
   (1) just **delete a hard disk partition** (without wiping disk sectors) — set the switch to **Delete partition.**
   (2) **delete a hard disk partition** and fully **wipe partition sectors** — set the switch to **Delete partition and destroy data**.

Delete Partition
Deleting the selected partition and optionally wiping the space it allocated.
Deleted partitions can not be restored!
Delete partition
Delete partition and destroy data. Enter the number of over-write passes:
1
OK
Cancel

Delete Partition window

Having set the switch to **Delete partition and destroy data**, enter a **number of passes** for wiping.

Wiping unallocated disk space means multiple writing of special data to hard disk sectors. Acronis Disk Director Suite features a rather simple wiping algorithm. During each pass, a symbol sequence or logical zeroes (0x00) or ones (0xFF) is written to unallocated space sectors. Only logical zeroes are written during the last pass. **The more passes** performed, the more complete the wiping will be.

Acronis offers extremely powerful hard disk/partition wiping software — **Acronis Privacy Expert Suite**, featuring strict algorithms for **guaranteed confidential information wiping and destruction**.

4. Confirm partition deletion by clicking OK in the **Delete Partition** window.
5. By clicking OK in the **Delete Partition** window, you'll add the pending operation of partition deletion (your actions may only undo an existing operation depending on the situation selected see 2.4.5 «Modifying pending operations»).

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The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

Attention! Deleting a partition destroys all its data, including files and folders! Deleting a system partition will make a PC inoperable. Take special care when performing this operation.

Deleting a partition Windows 98/Me can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

4.1.11 Checking hard disk partitions for errors

Acronis Disk Director Suite enables you to check hard disk partitions for file system errors.

Hard disk partitions should be checked before any partition operations (see 1.7 «Before You Run ».

If you need to check a hard disk partition:

1. Select a hard disk and partition in the Acronis Disk Director Suite main window.
2. Select **Disk → Check** or a similar item in the **Operations** sidebar list, or click **Check the selected partition for errors** on the toolbar.
3. If you want to find and fix errors, chose one of the next options:
   - **Check partitions for errors**
   - **Check and fix found errors**
   - **Check and fix errors and locate bad sectors.**
4. By clicking OK, you'll run partition checking.
5. Results are shown in the **Check Partition** window.

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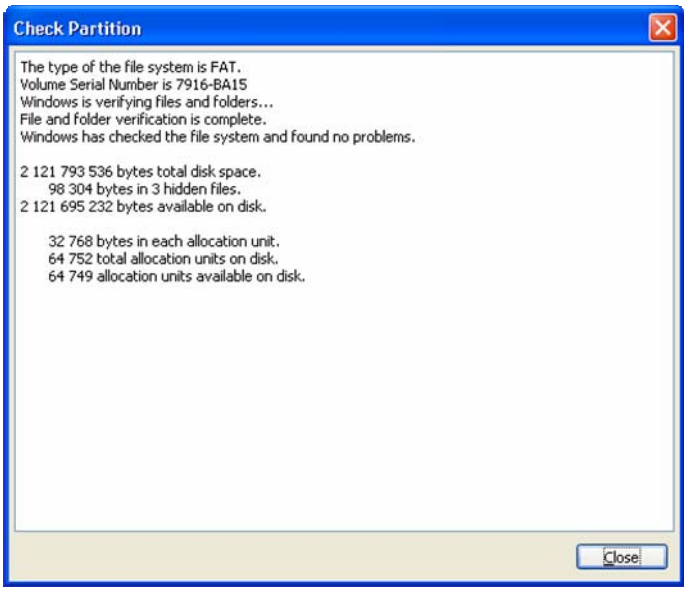
Check Partition
The type of the file system is FAT.
Volume Serial Number is 7916-BA15
Windows is verifying files and folders...
File and folder verification is complete.
Windows has checked the file system and found no problems.
2 121 793 536 bytes total disk space.
98 304 bytes in 3 hidden files.
2 121 695 232 bytes available on disk.
32 768 bytes in each allocation unit.
64 752 total allocation units on disk.
64 749 allocation units available on disk.
Close

Partition check results window

4.1.12 Defragmenting a partition

Defragmentation is reorganizing file storage on a hard disk partition.

Defragmentation is the process of eliminating file fragmentation, which causes files to be spread across the disk after operations.

File fragmentation significantly reduces PC and server performance, especially when intensive I/O operations are taking place. Conversely, file defragmentation can increase performance, as the read head has to move less across the disk to read all file parts.

Acronis Disk Director Suite supports defragmentation in Windows XP and Windows 2003 Server only. Windows 2000 has its own embedded disk defragmenter. To defragment a partition in Windows NT 4.0 and earlier Windows operating systems, it is recommended that you install a third-party disk defragmenter tool.

If you need to defragment a hard disk partition:

1. Select a hard disk and partition to defragment in the Acronis Disk Director Suite main window.
2. Select **Disk → Defragment** or a similar item in the **Operations** sidebar list, or click **Defragment the selected partition** on the toolbar.
3. By clicking OK in the **Defragmentation** window, you'll run partition defragmentation.,

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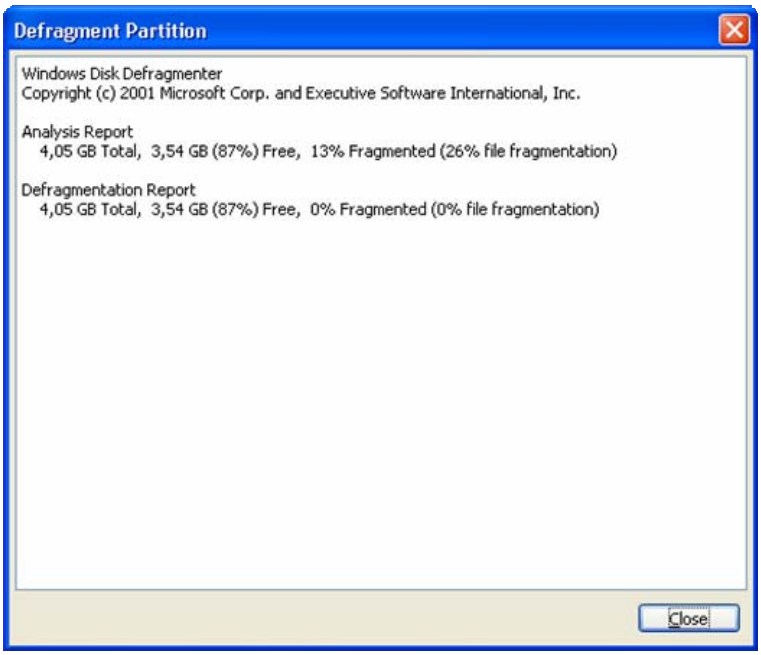
Defragmentation
Defragmenting the files and folders on the selected partition.
Consolidating fragmented files and folders so that each occupies a single, contiguous space.
Please press OK to start defragmenting now.
OK
Cancel

Run partition defragmentation window

4. Defragmentation results are shown in the **Defragment Partition** window.


Defragment Partition
Windows Disk Defragmenter
Copyright (c) 2001 Microsoft Corp. and Executive Software International, Inc.
Analysis Report
4,05 GB Total, 3,54 GB (87%) Free, 13% Fragmented (26% file fragmentation)
Defragmentation Report
4,05 GB Total, 3,54 GB (87%) Free, 0% Fragmented (0% file fragmentation)
Close

Partition defragmentation results window

4.1.13 Wiping unallocated hard disk space

PC hard disks can contain a substantial amount of confidential information. Often users forget that private information must be completely destroyed to avoid unauthorized access to it — simply deleting an old file is not sufficient.

Windows tools do not **guarantee** data destruction. Deleted files can be restored easily. Formatting and even deleting a partition leaves **hard disk sector contents** the same. Acronis Disk Director Suite offers a simple but reliable algorithm for wiping hard disk unallocated space.

If you need to wipe unallocated disk space:

1. Select a hard disk and unallocated space in the Acronis Disk Director Suite main window — **Wipe unallocated space** becomes available on the toolbar.

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2. Select **Disk → Wipe** or a similar item in the **Operations** sidebar list, or click **Wipe the selected unallocated space** on the toolbar.

3. In the **Wipe Unallocated Space** window, enter a number of disk passes (up to 99),

   For information about the Acronis Disk Director Suite data wiping algorithm see the commentary for 4.1.10 «Deleting a partition».

Hard disk passes number window

4. By clicking OK, you'll add a pending operation of unallocated disk space wiping.

4.1.14 Clearing a hard disk

Acronis Disk Director Suite lets you clear not only unallocated disk space, but an entire disk as well.

If you need to clear the entire hard disk:

1. Select a hard disk on the **Tree View** panel of Acronis Disk Director Suite — **Clear the current hard disk drive** button becomes available on the toolbar (if there is no **Tree View** panel in the main window, show it by selecting **View → Tree View**).

2. Select **Disk → Clear** or a similar item in the **Operations** sidebar list, or click **Clear the current hard disk drive** on the toolbar.

3. Select the clearing method in the **Clear Hard Drive** window; you can:

   (1) just **delete hard disk partitions** (without wiping disk sectors) — set the switch to **Delete partitions.**

   (2) **delete hard disk partitions** and fully **clear hard disk sectors** — set the switch to **Delete partitions and destroy data**.

   Having set the switch to **Delete partitions and destroy data**, enter the **number of passes** for wiping.

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Clear Hard Drive
Clearing the selected hard disk drive and optionally wiping its contents.
Deleted partitions can not be restored!
Delete partitions
Delete partitions and destroy data. Enter the number of overwriting passes:
1
OK
Cancel

Hard disk clearing parameters window

4. By clicking OK, you'll add a pending operation of hard disk clearing.

Deleting hard disk partitions does not destroy disk sector contents. They can be restored by special means, if needed. Therefore, if you need to destroy confidential information, set the switch to **Delete partitions and destroy data**!

For information about the Acronis Disk Director Suite data wiping algorithm see the commentary for 4.1.10 «Deleting a partition».

Deleting a partition in Windows 98/Me can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

4.2 Additional Partition Operations

Additional hard disk partition operations include some rarely used but useful operations for converting partition file systems, hiding and unhiding partitions, setting active partitions, changing root size and changing partition cluster size.

4.2.1 Changing partition letter

Some operating systems assign letters (C:, D:,...) to hard disk partitions at startup. They are used by applications and operating systems to locate files on partitions.

Connecting an additional disk, as well as creating or deleting a partition on existing disks, might change your system configuration. As a result, some applications might stop working or user files might not be opened. To prevent this, you can change letters assigned by an operating system.

If you need to change a letter assigned to a partition by an operating system:

1. Select the hard disk and partition on it.
2. Select **Disk → Advanced → Change Letter** or a similar item in the **Advanced** sidebar list, or click **Change the logical drive letter** on the toolbar.
3. Select a new letter in the **Change letter** window.

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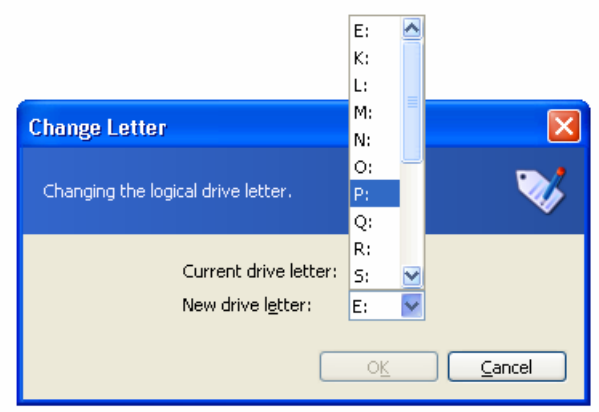

Change letter window

4. By clicking OK in the **Change letter** window, you'll add a pending operation to partition letter assignment (your actions may only undo or modify already existing operation; see 2.4.5 «Modifying pending operations»).

The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

Only Windows NT/2000/XP lets you change letters assigned to partitions. Windows 98/Me assigns letters to partitions automatically.

Directly changing a partition letter might affect shortcuts to existing partitions. Changing a partition letter in Windows NT/2000/XP might result in problems running applications and opening files on the partition. If it is a system or swap file partition, it might cause OS boot problems. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

4.2.2 Converting a file system

FAT16

The main *disadvantages* of FAT16 are:

- Inability to support partitions larger than 2 GB
- Inability to work with files larger than 2 GB
- Inability to work with hard disks larger than 8 GB
- Limited root size — up to 512 elements
- File names containing up to eight name symbols, a dot and three extension symbols (Windows NT do not have this limitation)

FAT32

The FAT32 file system appeared in Windows 95 OSR2 and is supported by Windows 98/Me and Windows 2000/XP.

Its main purpose was to remove FAT16 limitations. FAT32 is the evolution of FAT16.

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The main difference between FAT32 and FAT16 is the support of higher-capacity folders, files and disks, and more flexible root organization that features unlimited size and long file-name support. (For more details see A.9 «File System Main Specifications».)

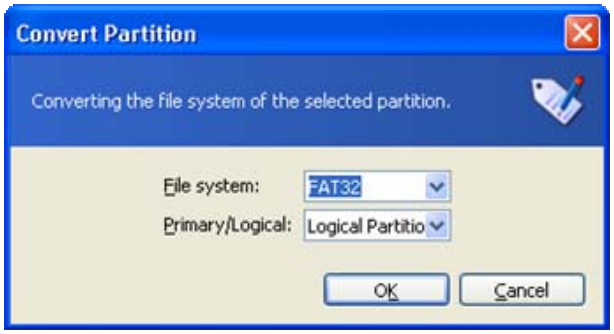
Converting FAT16 to FAT32

You would convert a FAT16 partition to FAT32 in the following cases:

1. If you need a partition larger than 2 GB.
2. If you replace a small-capacity hard disk with a high-capacity hard disk

If you need to convert a FAT16 partition to FAT32:

1. Select the disk and FAT16 partition to convert to FAT32 from the list in the Acronis Disk Director Suite main window.
2. Select **Disk → Advanced → Convert** or a similar item in the **Advanced** sidebar list, or click **Convert the file system on the selected partition** on the toolbar (or select it from partition or the graphical representation context menu).
3. Enter partition type (**Logical** — **Primary**) in the **Convert Partition** window.



Convert partition window

4. By clicking OK, you'll add a pending operation of FAT16 partition conversion to FAT32 partition (your actions may only undo or modify an existing operation. See 2.4.5 «Modifying pending operations»).

The new partition file system will be graphically represented in the Acronis Disk Director Suite main window.

Attention! Converting a FAT16 partition to FAT32 might cause the installed operating system to stop «understanding» the file system and/or the allocation table. For more information about compatibility of file and operating systems see A.9 «File System Main Specifications».

4.2.3 Hiding a partition

Acronis Disk Director Suite allows you to hide a partition. It can be useful for protecting important information from unauthorized or casual access. Unlike other software, Acronis Disk Director Suite can hide any partition independent of its type, primary or logical.

If you need to hide a partition:

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1. Select a disk and a partition to hide in the list in the Acronis Disk Director Suite main window.
2. Execute operation of partition hiding by selecting **Disk → Advanced → Hide** or a similar item in the **Advanced** sidebar list, or by clicking **Hide the selected partition** on the toolbar (or select it from partition or the graphical representation context menu).
3. By clicking OK in the **Hide Partition** window, you'll add a pending operation of partition hiding (your actions may only undo or modify an existing operation. See 2.4.5 «Modifying pending operations»).

Hide Partition
Hiding the selected partition.
Hiding this partition may cause drive letters to changed.
Are you sure you want to hide the partition?
OK
Cancel

Hide Partition window

A hidden partition is labeled **Hid** in the **Flags** field of the partition list in the main window.

Attention! Hiding a system partition will prevent your PC from booting. Hiding a swap file partition in Windows NT/2000/XP will produce a similar result. If you have several primary partitions with different operating systems, hiding an active system partition will automatically make another partition active.

Note that the **Advanced → Hide** sidebar item is changed to **Advanced → Unhide** after you select a hidden partition from the list. The partition context menu also changes.

Hiding a partition in Windows 98/Me can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. In Windows NT/2000/XP, hiding a partition does not affect letters assigned to other partitions. As a result, only hidden partition shortcuts will stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

4.2.4 Unhiding a partition

Unhiding a partition is performed so an operating system can "see" the partition, assign it a letter and provide access to its files.

If you need to unhide a partition:

1. Select a disk and partition to unhide from the list in the Acronis Disk Director Suite main window.
2. Select **Disk → Advanced → Unhide** or a similar item in the **Advanced** sidebar list, or click **Unhide the selected partition** on the toolbar (or select it from partition or the graphical representation context menu).

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3. By clicking OK in the **Unhide Partition** window, you'll add the pending operation to partition unhiding (your actions may only undo or modify an existing operation, See 2.4.5 «Modifying pending operations»).

Unhide Partition
Unhiding the selected partition.
Unhiding this partition may cause drive letters to changed.
Are you sure you want to unhide the partition?
OK
Cancel

Unhide partition window

The partition **Hid** label will disappear from the **Flags** field.

Note that the **Advanced → Unhide** sidebar item is changed to **Advanced → Hide** after you select a hidden partition from the list. The partition context menu changes the same.

If you unhide the only primary partition on a disk, it will be set active.

Unhiding a partition in Windows 98/Me can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

4.2.5 Setting active partition

If you have several primary partitions, you must specify one to be the boot partition. For this, you can set a partition to active. A disk can have only one active partition.

If you need to set an active partition:

1. Select a **primary** partition to set to active from the list in the Acronis Disk Director Suite main window.
2. Select **Disk → Advanced → Set Active** or a similar item in the **Advanced** sidebar list, or click **Set the selected partition as active** on the toolbar (or select it from partition or the graphical representation context menu).

Set Active Partition
Setting the selected partition as active.
Setting this partition as active may cause drive letters to change.
Are you sure you want to set the partition as active?
OK
Cancel

Set Active Partition

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3. By clicking OK in the **Set Active Partition** window, you'll add the pending operation of setting active partition (your actions may only undo or modify an existing operation. See 2.4.5 «Modifying pending operations»).

The new partition structure will be graphically represented in the Acronis Disk Director Suite main window.

The partition will be marked **Act** in the **Flags** field. The primary partition is also marked **Pri**, so the **Flags** field will contain **Pri, Act**.

Before you make a partition active, you must make sure it is formatted and contains an operating system. Otherwise your PC will not boot from this partition!

If you set a partition to active and there was another active partition on a disk, it will be unset **automatically**. This also might prevent your PC from booting.

Setting an active partition in Windows 98/Me can change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

4.2.6 Resizing a root

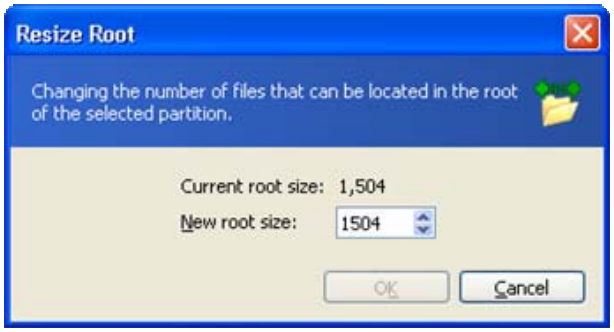
Unlike all others, the FAT16 root is located in a special place and has a limited size (512 elements after standard formatting). Acronis Disk Director Suite lets you change the root size of existing partitions.

If you need to resize a FAT16 partition root:

1. Select a disk and FAT16 partition from the list in the Acronis Disk Director Suite main window.
2. Select **Disk → Advanced → Resize Root** or a similar item in the **Advanced** sidebar list, or click **Change the number of files that can be located in the root of the selected partition** on the toolbar (or select it from partition or the graphical representation context menu).

   If you select a partition with another file system, mentioned sidebar and context menu items will not be available.

3. Enter the new root size (a number of elements) in the **Resize Root** window.


Resize Root
Changing the number of files that can be located in the root of the selected partition.
Current root size: 1,504
New root size: 1504
OK
Cancel

Resize FAT16 root window

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FAT16 can contain a maximum of 65,520 elements.

4. By clicking OK, you'll add the pending operation of FAT16 partition root resizing (your actions may only undo or modify an existing operation. See 2.4.5 «Modifying pending operations»).

4.2.7 Changing cluster size

Smaller clusters (see Appendix C «Glossary» — «**Cluster**») might significantly reduce disk space losses because any file occupies at least one cluster/block.

Disk space losses, depending on cluster size, are shown in Appendix A (see A.9.2 «FAT16» — Table 3).

However, reducing FAT32 partition cluster size might increase the space occupied by the file allocation table (FAT) and slow down file access.

If you need to change cluster size:

1. Select a disk and partition from the list in the Acronis Disk Director Suite main window.
2. Select **Disk → Advanced → Change cluster size** or a similar item in the **Advanced** sidebar list, or click **Change the cluster size of the selected partition** on the toolbar (or select it from partition or the graphical representation context menu).
3. In the **Cluster Size** window, you can:
   (1) see the current cluster size of the selected partition.
   (2) see average statistics of disk space losses for the selected partition and different cluster size.

Some cluster sizes might become unavailable for a partition because there will not be enough clusters to store the actual partition data.

   (3) set new cluster size in the **New cluster size** field.

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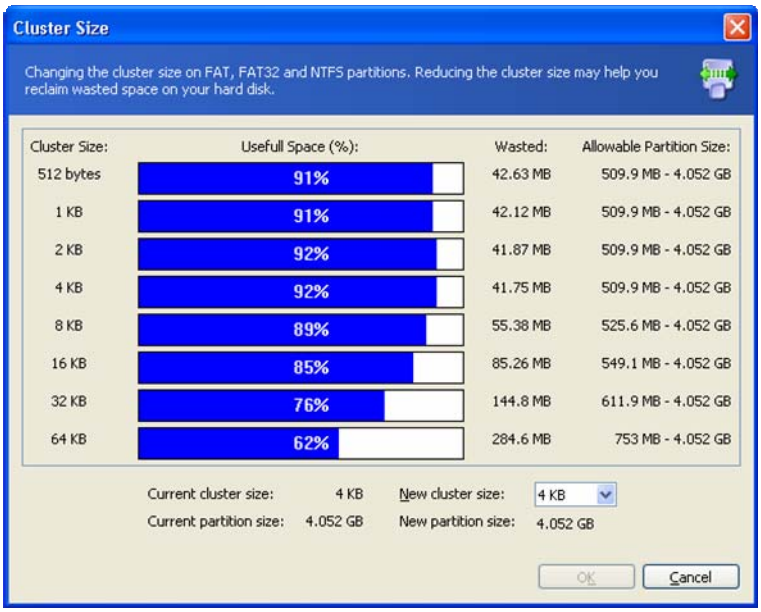

Cluster size window

4. By entering a new cluster size and clicking OK in the **Cluster Size** window, you'll add the pending operation of cluster resizing (your actions may only undo or modify an existing operation, See 2.4.5 «Modifying pending operations»).

4.2.8 Changing partition type

Each partition record includes the «partition type field». It is a hexadecimal value that defines the file and operating system suitable for a partition.

This hexadecimal value is optional, as some operating systems use it and some do not. In particular, Windows 98/Me only uses the «partition type» field when determining if it can support a partition.

Usually, partition type is set during its creation **depending on the file system** to be used. However, you might need to select the type manually. For example, if a partition is created without a file system or if a partition is meant for use with a specific OS, it must be assigned a corresponding type.

If you need to change partition type:

1. Select a disk and partition from the list in the Acronis Disk Director Suite main window.
2. Select **Disk → Advanced → Change type** or a similar item in the **Advanced** sidebar list, or click **Change the type of the selected partition** on the toolbar (or select it from partition or the graphical representation context menu).
3. Select the necessary partition type in the **Partition type** window.

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Partition type window

4. By clicking OK in the **Partition type** window, you'll add the pending operation of partition type changing (your actions may only undo or modify an existing operation, See 2.4.5 «Modifying pending operations»).

Attention! Changing partition type might prevent some operating systems from working with it, even if it is a compatible file system!

Changing partition type in Windows 98/Me can hide a partition and change the order of letters assigned to other partitions. As a result, some shortcuts might stop working. A detailed discussion of partition letter assignment rules for various operating systems appears in 3.1 «Creating A New Partition».

4.2.9 Resizing i-node table in Linux Ext2/Ext3

In Linux Ext2/Ext3, the i-node index descriptor is the main data structure describing files.

Each descriptor contains a file description, including file type, size, data block pointers, etc. Data block addresses reserved for a file are stored in its index descriptor.

The space for all i-nodes must be allocated in advance (at formatting). In the Ext2/Ext3 file systems, the maximum number of files is set at formatting.

The «bytes per a single i-node» value indicates the average partition file size. If there are many small files, there must be many descriptors, each of which occupies some space. Large files require fewer descriptors.

Acronis Disk Director Suite enables you to resize i-node tables of existing partitions to change the maximum file amount on them.

If you need to resize an i-node table of an existing Linux Ext2/Ext3 partition:

1. Select a disk and Linux Ext2/Ext3 partition from the list in the Acronis Disk Director Suite main window.

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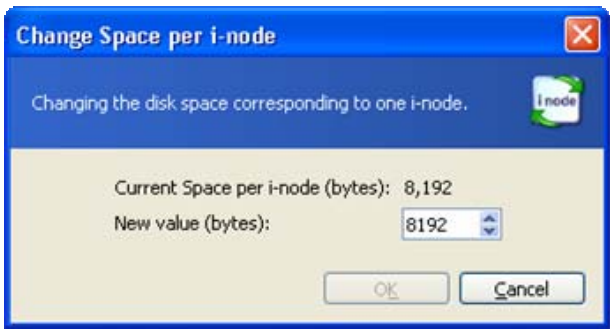
2. Select **Disk → Advanced → Change Bytes per i-node** or a similar item in the **Advanced** sidebar list, or click **Change the number of bytes per i-node** on the toolbar (or select it from partition or the graphical representation context menu).

If you select a partition with another file system, mentioned sidebar and context menu items will be unavailable.

3. Enter the new amount of bytes per descriptor (i-node) in the Change bytes per i-node window.



Resize i-node window

4. By clicking OK in the Change bytes per i-node window, you'll add the pending operation of Linux Ext2/Ext3 partition i-node resizing (your actions may only undo or modify an existing operation, See 2.4.5 «Modifying pending operations»).

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Chapter 5. Working with Acronis Recovery Expert

Acronis Recovery Expert allows recovery of hard disk partitions accidentally deleted or damaged due to a hardware or software failure. It uses a wizard interface.

You can **run** Acronis Recovery Expert in the following ways.

While working with Acronis Disk Director Suite in the **Automatic mode:**

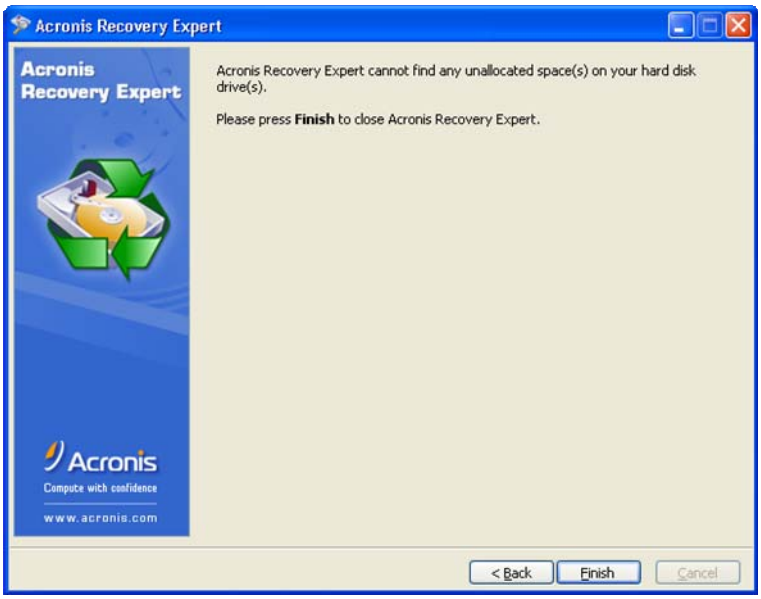
- Using **Recover Partition** item in the **wizards** section of the Acronis Disk Director Suite **main window sidebar**
- Using the respective **main menu** item

While working in the **Manual mode:**

- Using **Advanced → Recover** item of the context menu by hovering a mouse pointer over **Unallocated space** and right-clicking

Then Acronis Recovery Expert begins reading the partition configuration of your hard disks.

After the process is finished, you may see a warning that there are no unallocated spaces on your hard disks:



Hard disks do not have any unallocated spaces

Please note: the entire hard disk space can be partly partitioned and/or partly unallocated. If you delete a disk partition – whether intentionally or by mistake – its space becomes unallocated. You can create a new partition using unallocated space only.

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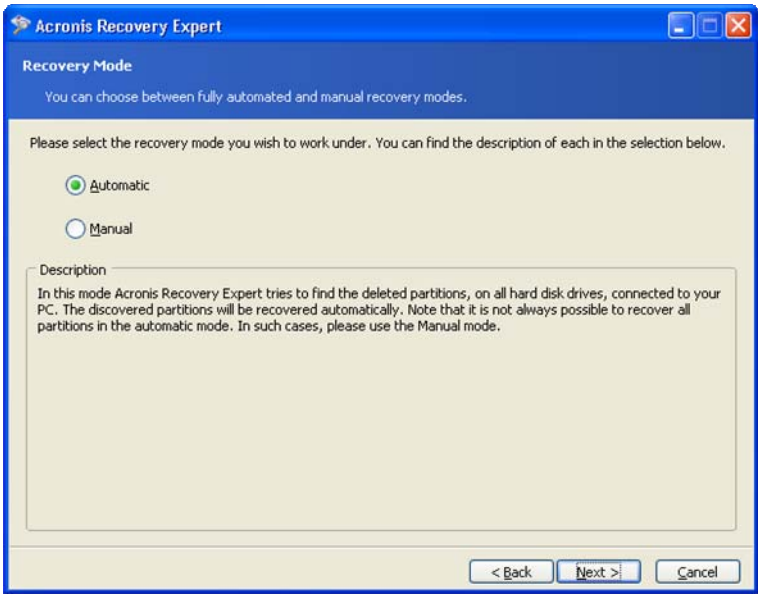
Acronis Recovery Expert checks to see if your hard disks contain unallocated space. If you have none, then it makes no sense to search for deleted partitions. If you have unallocated space, it **may** have contained one or more partitions. Acronis Recovery Expert will search unallocated space thoroughly – either automatically or manually.

5.1 Automatic Recovery

You can recover deleted partitions automatically or manually. To do so, set the switch to the necessary position in the **Recovery mode** window.

Let us describe automatic partition recovery first. Set the switch to **Automatic**.


Acronis Recovery Expert
Recovery Mode
You can choose between fully automated and manual recovery modes.
Please select the recovery mode you wish to work under. You can find the description of each in the selection below.
Automatic
Manual
Description
In this mode Acronis Recovery Expert tries to find the deleted partitions, on all hard disk drives, connected to your PC. The discovered partitions will be recovered automatically. Note that it is not always possible to recover all partitions in the automatic mode. In such cases, please use the Manual mode.
< Back
Next >
Cancel

Selecting Automatic recovery mode

In the next **Searching for Deleted Partitions** window, Acronis Recovery Expert searches for all deleted partitions. The search progress is shown in the lower part of the window.

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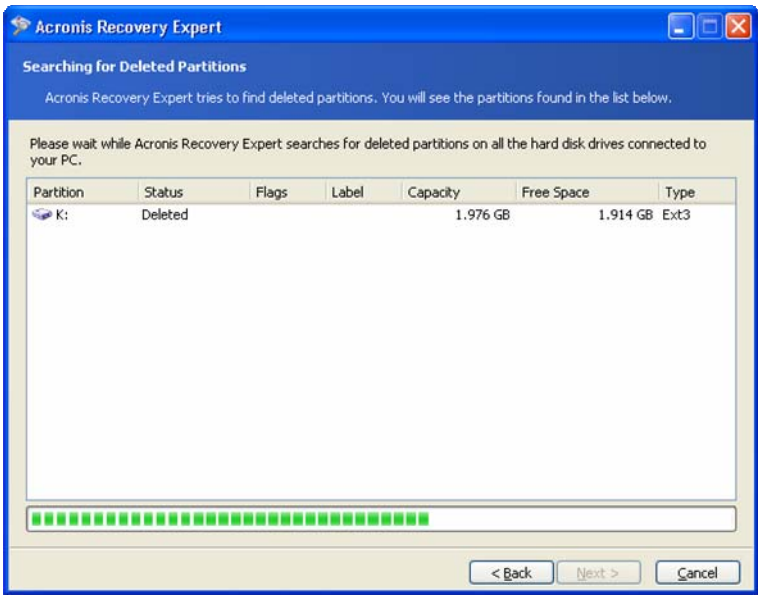

Deleted partitions search progress

The information about hard disk partitions is stored in a special disk area – the 1st sector of 0th cylinder, 0th head – called the partition table. This sector is called a boot sector or the master boot record (MBR). Acronis Recovery Expert not only checks the partition table for deleted partitions, but also scans the entire disk surface. Therefore the recovery process might take some time to complete.

Please note: Acronis Recovery Expert may find deleted partition(s) almost at once (in a few seconds). Partition(s) found are then added to the list in the **Searching for Deleted Partitions** window. The search will, however, continue until the entire disk is scanned for partitions.

In the automatic recovery mode, the search must be finished before you can proceed to the next recovery steps. The `Next` button becomes enabled only after the progress bar is full in the **Searching for Deleted Partitions** window. The manual mode however enables you to work at once (see 5.2 «Manual Recovery»).

Partitions found during the search are shown in the list with their main parameters:

- number
- status
- label
- capacity
- partition free space
- file system

Please note: Found partitions are automatically added to the list **during** the search.

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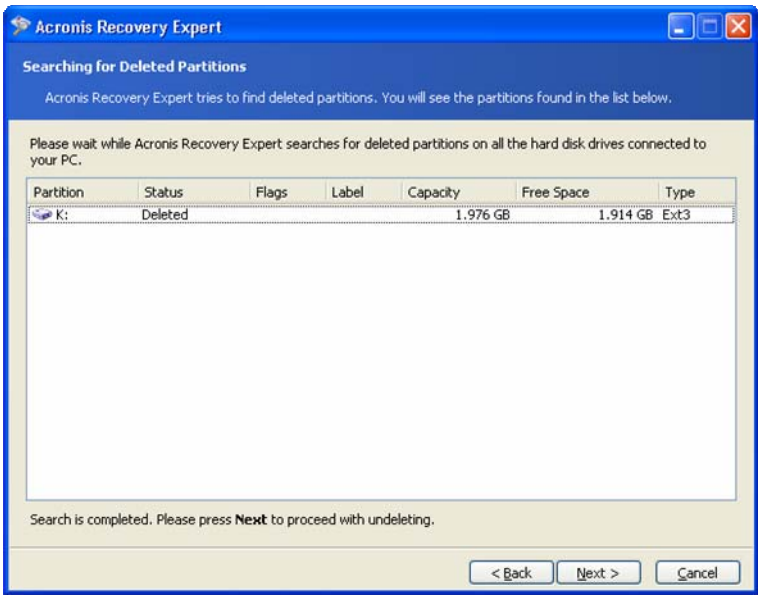
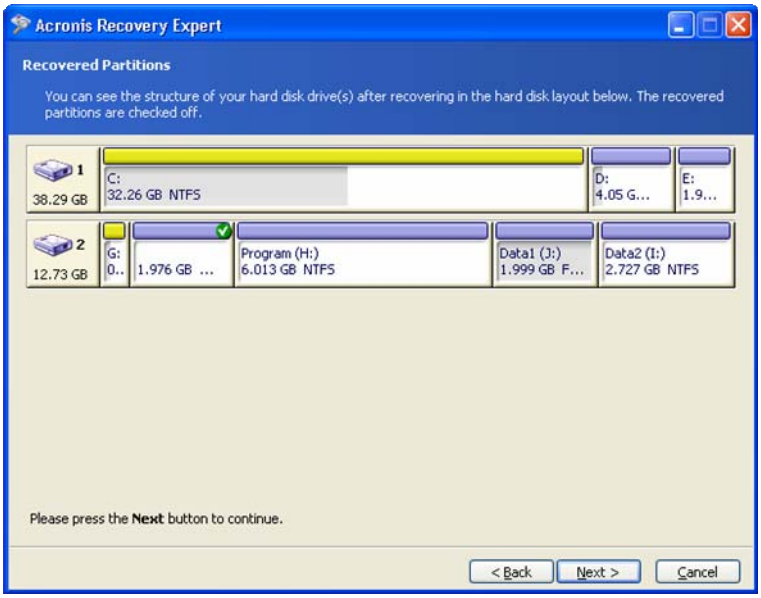


A deleted partition found

Note that you do not have to select partitions for recovery in the automatic mode. Acronis Recovery Expert will recover **all** partitions found.

The **Recovered Partitions** window shows a partition to recover as a part of hard disk partition structure, marking it with an icon in the upper right corner of its rectangle.



A hard disk partition to be recovered

A partition has been found by Acronis Recovery Expert and is shown in the disk structure, but has not yet been recovered.

This finishes partition recovery preparations. To complete this operation, select **Commit** in the **Operations** section of the **Main menu**. This will complete the given partition recovery.

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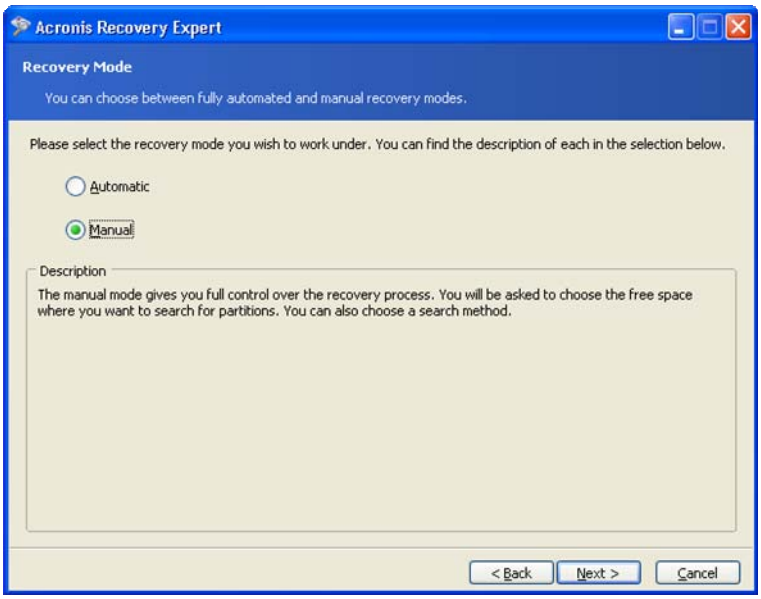
If you exit Acronis Disk Director Suite without confirming the partition recovery operation, it will be canceled.

5.2 Manual Recovery

Set the switch to **Manual** in the **Recovery mode** window to select the manual recovery mode.


Acronis Recovery Expert
Recovery Mode
You can choose between fully automated and manual recovery modes.
Please select the recovery mode you wish to work under. You can find the description of each in the selection below.
Automatic
Manual
Description
The manual mode gives you full control over the recovery process. You will be asked to choose the free space where you want to search for partitions. You can also choose a search method.
< Back
Next >
Cancel

Selecting manual recovery mode

The next **Searching Method** window enables you to select one of two deleted partition searching methods: 1) **Fast;** 2) **Complete**.

What's the difference? Using the **Fast** search method, Acronis Recovery Expert checks the beginning of each side of every cylinder of a hard disk. Using the **Complete** method, Acronis Recovery Expert checks every hard disk sector.

The **Fast** method takes less time, while the **Complete** method is slower but more thorough.

Note that the **Fast** method should find all deleted partitions in most cases!

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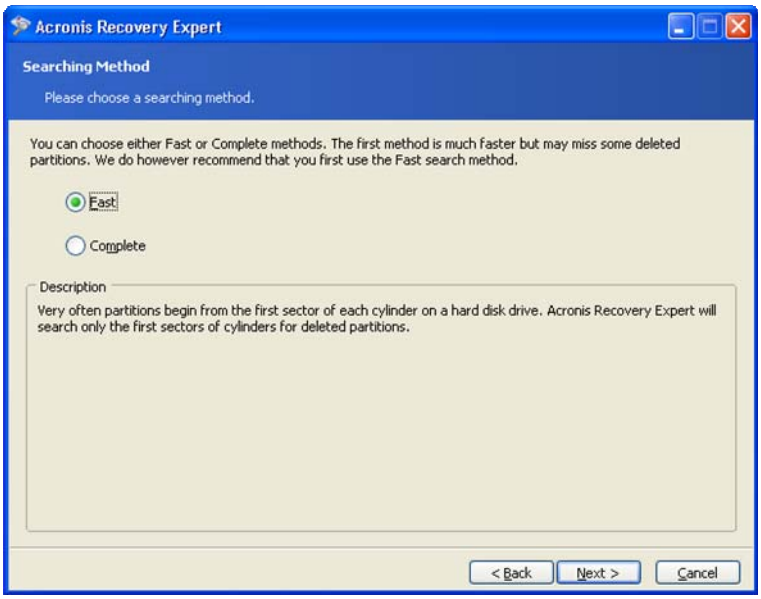
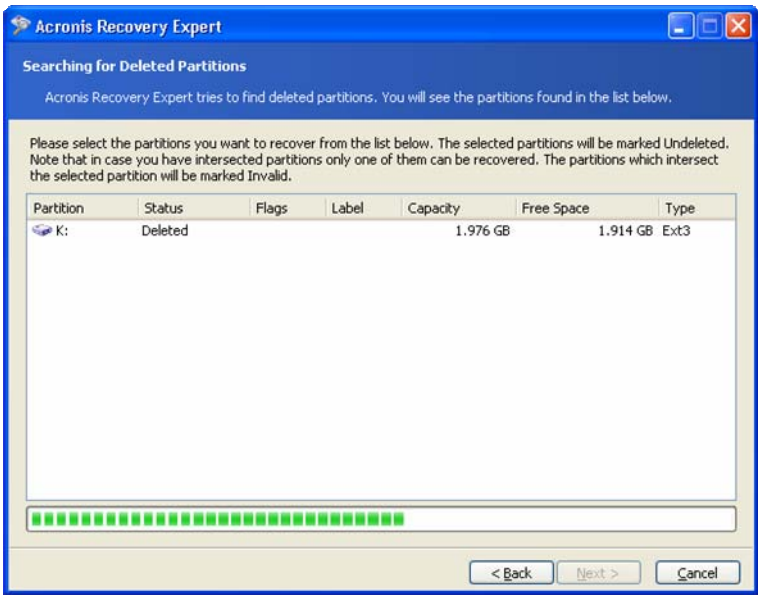

Acronis Recovery Expert
Searching Method
Please choose a searching method.
You can choose either Fast or Complete methods. The first method is much faster but may miss some deleted partitions. We do however recommend that you first use the Fast search method.
Fast
Complete
Description
Very often partitions begin from the first sector of each cylinder on a hard disk drive. Acronis Recovery Expert will search only the first sectors of cylinders for deleted partitions.
< Back
Next >
Cancel

Searching method selection

The **Searching for Deleted Partitions** window shows you parameters of a partition that existed on the selected unallocated space before it was deleted.


Acronis Recovery Expert
Searching for Deleted Partitions
Acronis Recovery Expert tries to find deleted partitions. You will see the partitions found in the list below.
Please select the partitions you want to recover from the list below. The selected partitions will be marked Undeleted. Note that in case you have intersected partitions only one of them can be recovered. The partitions which intersect the selected partition will be marked Invalid.
Partition
Status
Flags
Label
Capacity
Free Space
Type
K:
Deleted
1.976 GB
1.914 GB
Ext3
< Back
Next >
Cancel

A deleted hard disk partition found by Acronis Recovery Expert

Unlike in the automatic recovery mode, you do not have to wait until the search for deleted hard disk partitions is finished in the manual mode. As a found partition or multiple partitions are added to the list, you can select them for immediate recovery. Selecting a partition enables the `Next` button. Clicking it, you'll stop the search and proceed to recovery.

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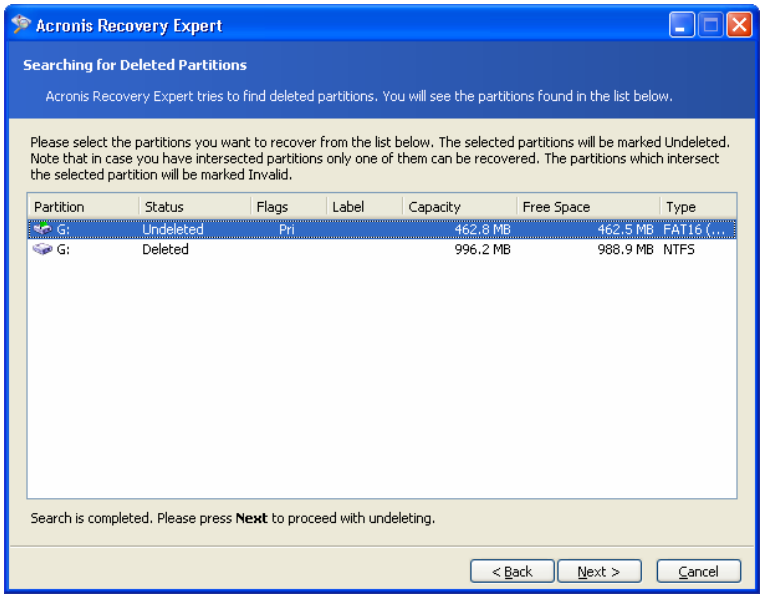
The manual recovery mode allows you to select all found partitions for recovery. For example, if one of your partitions was deleted intentionally and another by mistake, the manual mode enables you to select and recover only the partition you deleted by mistake. Partitions are selected for recovery by clicking them.

Click the partition rectangle to select the deleted partition and continue recovery.


Acronis Recovery Expert
Searching for Deleted Partitions
Acronis Recovery Expert tries to find deleted partitions. You will see the partitions found in the list below.
Please select the partitions you want to recover from the list below. The selected partitions will be marked Undeleted. Note that in case you have intersected partitions only one of them can be recovered. The partitions which intersect the selected partition will be marked Invalid.
Partition
Status
Flags
Label
Capacity
Free Space
Type
G:
Undeleted
Pri
462.8 MB
462.5 MB
FAT16 (...
G:
Deleted
996.2 MB
988.9 MB
NTFS
Search is completed. Please press Next to proceed with undeleting.
< Back
Next >
Cancel

A deleted partition selected for recovery

This finishes partition recovery preparations. To complete this operation, select **Commit** in the **Operations** section of the **Main menu**.

If you exit Acronis Disk Director Suite without confirming a partition recovery operation, it will be canceled.

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Chapter 6. Working with Acronis Disk Editor

6.1 General information

Acronis Disk Editor is a professional-grade program that performs a variety of actions on a hard disk: restore boot records and files and folder structure, find lost clusters, remove computer virus code from a disk and much more.

This program has much to offer a beginner as well. It can be used as an educational tool. It is one thing to read a few books about hard disk construction and data storage, but it's quite another to observe it yourself with the Acronis Disk Editor.

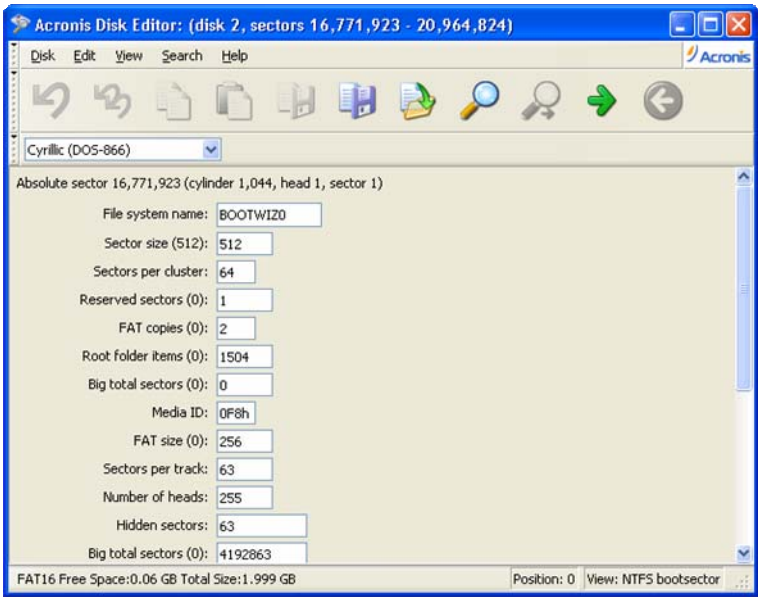
6.2 The selection of the partition or a disk for editing

Disk or partition data editing operations are only available in the **Manual mode** of Acronis Disk Director Suite.

To start editing hard disk or partition data:

- Select the necessary partition (disk) to edit with Acronis Disk Editor from the list of available partitions (disks) in the Acronis Disk Director Suite main window
- Select **Edit** in the **Advanced** section of the main window sidebar or the respective item of the context menu invoked by right-clicking. You can also access editing operations selecting **main menu: Disk → Advanced → Edit**

This will invoke Acronis Disk Editor, providing access to other editing operations of the selected partition (disk):


Acronis Disk Editor: (disk 2, sectors 16,771,923 - 20,964,824)
Disk Edit View Search Help
Acronis
Cyrillic (DOS-866)
Absolute sector 16,771,923 (cylinder 1,044, head 1, sector 1)
File system name: BOOTWIZ0
Sector size (512): 512
Sectors per cluster: 64
Reserved sectors (0): 1
FAT copies (0): 2
Root folder items (0): 1504
Big total sectors (0): 0
Media ID: 0F8h
FAT size (0): 256
Sectors per track: 63
Number of heads: 255
Hidden sectors: 63
Big total sectors (0): 4192863
FAT16 Free Space:0.06 GB Total Size:1.999 GB
Position: 0
View: NTFS bootsector

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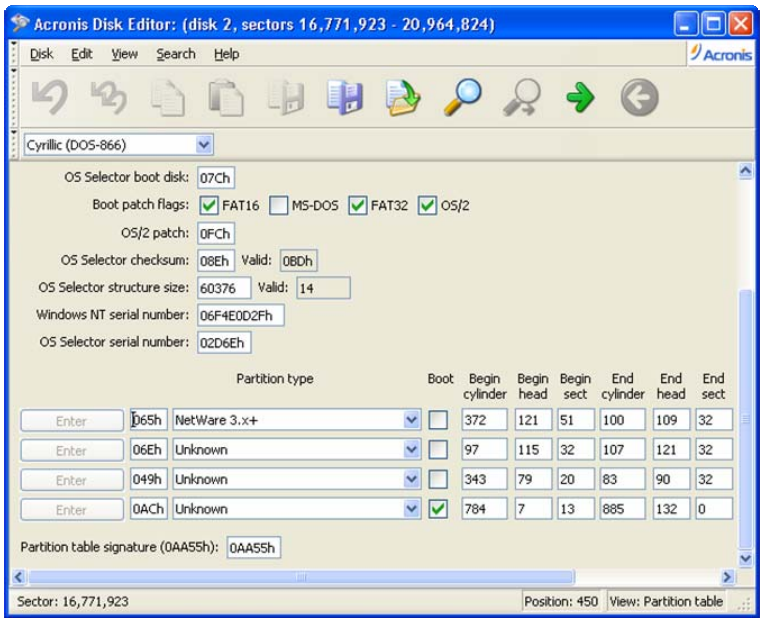
6.3 Main Window of the Program

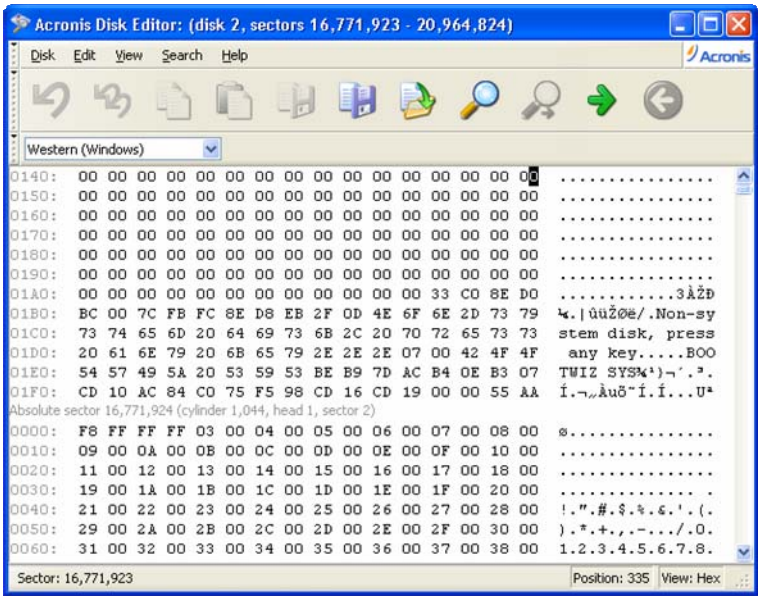
The main window shows the numbers of disk and sector where the internal program cursor is positioned. It usually contains information about the work of various modes. Below the main window of the program is the view as partition table mode.


Acronis Disk Editor: (disk 2, sectors 16,771,923 - 20,964,824)
Disk Edit View Search Help
Acronis
Cyrillic (DOS-866)
OS Selector boot disk: 07Ch
Boot patch flags: FAT16 MS-DOS FAT32 OS/2
OS/2 patch: 0FCh
OS Selector checksum: 08Eh Valid: 0BDh
OS Selector structure size: 60376 Valid: 14
Windows NT serial number: 06F4E0D2Fh
OS Selector serial number: 02D6Eh
Partition type Boot Begin cylinder Begin head Begin sect End cylinder End head End sect
Enter 065h NetWare 3.x+ 372 121 51 100 109 32
Enter 06Eh Unknown 97 115 32 107 121 32
Enter 049h Unknown 343 79 20 83 90 32
Enter 0ACh Unknown 784 7 13 885 132 0
Partition table signature (0AA55h): 0AA55h
Sector: 16,771,923
Position: 450
View: Partition table

The main window in the view as partition table mode

To make the information contained in this field sensible, the current sector should be the MBR or the extended partition table.

The next figure shows the partition table as a single dump (hexadecimal byte values are on the left, and the corresponding characters are on the right).


Acronis Disk Editor: (disk 2, sectors 16,771,923 - 20,964,824)
Disk Edit View Search Help
Acronis
Western (Windows)
Absolute sector 16,771,924 (cylinder 1,044, head 1, sector 2)
Sector: 16,771,923
Position: 335
View: Hex

The main window in the view as hex mode

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The current editing position is shown by the cursor that can be either in the left or right part of the window

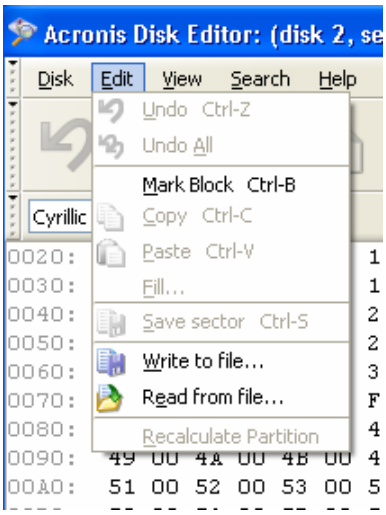
In this section of the guide, all examples of Acronis Disk Editor's main window view modes are given for demonstration purposes.

The main menu of Acronis Disk Editor contains the following items:

- **Disk** – allows you to browse properties of a disk being edited
- **Edit** – allows you to manipulate blocks of selected hard disk partitions; also allows you to save contents of a disk sector after editing
- **View** – allows you to select a view mode for more convenient presentation of data
- **Search** – allows you to search a partition (or a hard disk) for any line (or any sequence of characters) and go to a certain disk sector according to its absolute offset
- **Help** – allows you to get help concerning the editor window or about the program's developer and version

6.4 Edit Hard Disks

The **Edit** menu of the Acronis Disk Editor main window allows you to access the main operations with blocks of given hard disk sectors. You can edit hard disk data directly in the fields of any view mode (see the **View** menu). You can manipulate data blocks using **Edit** menu in the view as hex mode.



Edit menu

Any view mode allows you to select blocks with the help of the mouse by clicking and holding its left button, or with the help of the keyboard, advancing the window with `Shift` key pressed.

When viewing in hex mode, simply changing data in the hexadecimal or character area in the main window — or in any fields of other view modes — will not change the given disk sector. To execute the changes, you must save them first. After making changes, you will

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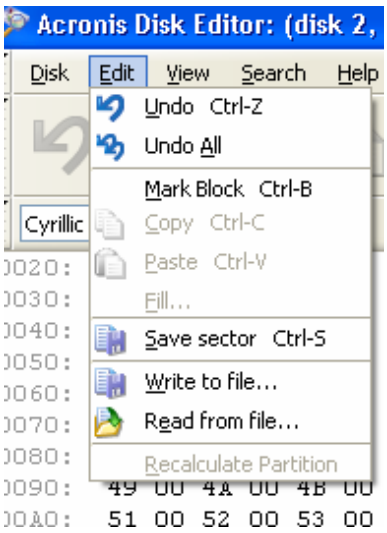
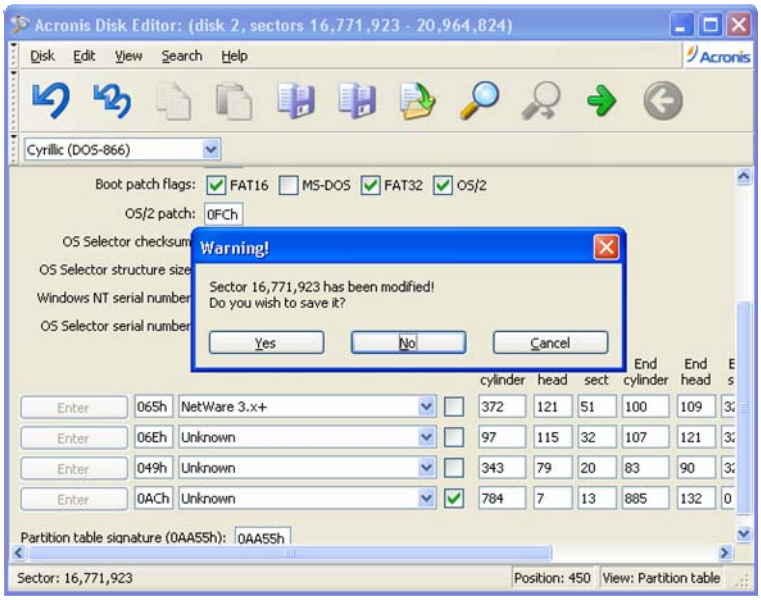
see that the **Save sector** item in **Edit** menu will become enabled as well as the appropriate toolbar button. If you do not save your changes, you effectively reject them.



Save sector operation

If you have made changes in a hard disk sector and decide to exit the editor without saving them, you will see a warning about saving your changes.



Saving modified sector

6.5 Write Block to a File and Read from a File

The **Write to file…** and **Read from file…** menu items allow you to save the selected block to a file or to read the block from a file and save it to a disk sector.

The selection of the **Write to file…** item results in opening the **Write to file** window (the block to be saved should already be selected). In this window, enter the file name and its path or locate a file by clicking the `Browse…` button. The file size will be calculated automatically. To save a file, click the `OK` button.

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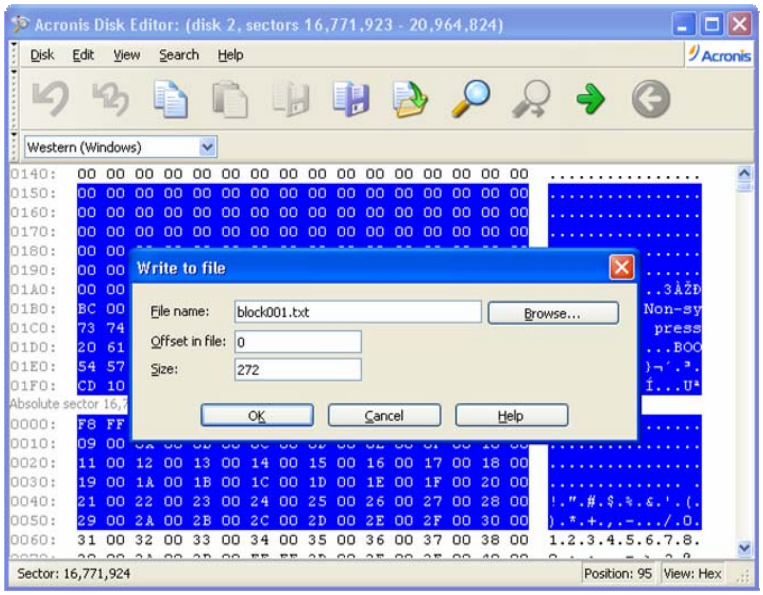
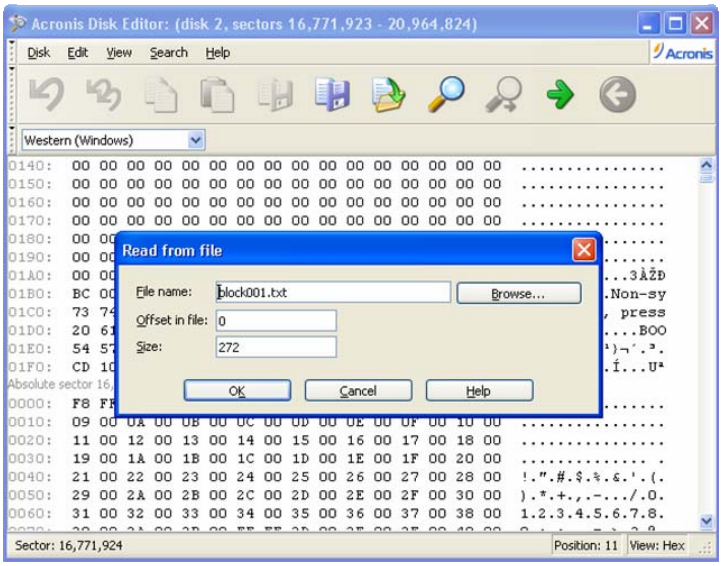


Write to a file

To read a block from a file and insert it into a disk sector, you must place the cursor on the necessary sector byte and then select **Read from file…** menu item. The selection of this menu item will result in opening the **Read from file** window. In this window, enter the file name and its path or locate a file by clicking the Browse… button. To insert file contents to a sector from the current cursor position (or considering offset in the file), click the OK button.



Read from a file

6.6 View

Information in the Acronis Disk Editor window can be viewed and edited in several different modes. You can select the appropriate view mode with the help of the **View** menu.

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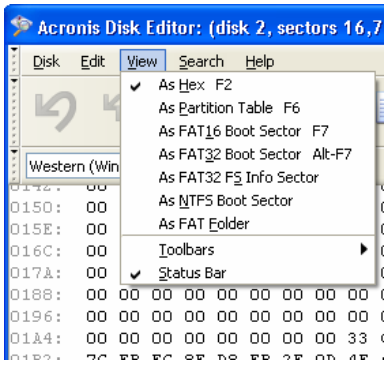


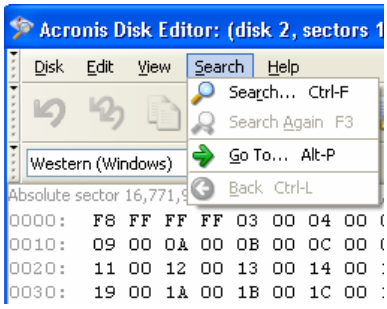
View menu

The editor offers seven view modes:

- hex
- partition table
- FAT16 boot sector
- FAT32 boot sector
- FAT32 FS info sector
- NTFS boot sector
- FAT folder

6.7 Search

The **Search** menu allows you to search a hard disk for some line and to go to a disk sector according to its absolute offset.



Search Menu

Selecting the **Search** item in the same menu will give you access to functions for searching lines in the disk being edited. (You can do the same by pressing `Ctrl+F` key combination.) Search parameters can be set in the **Search** dialog window.

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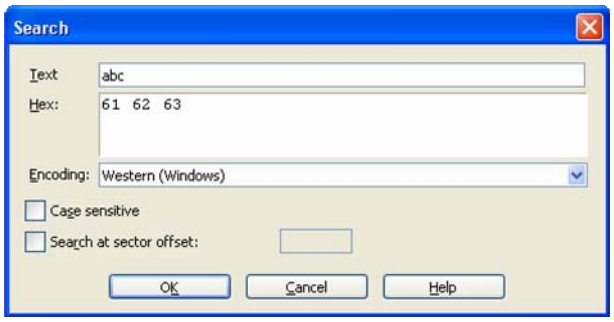


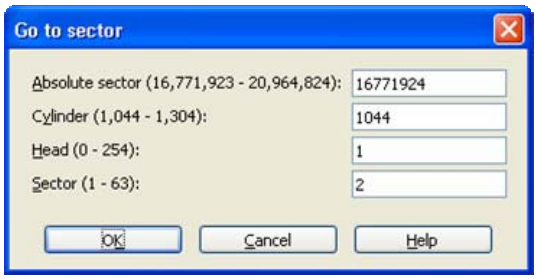
The Search dialog window

A search line can be set both as char and numeric (hexadecimal) values. During a search, you can ignore letter case as well as search for a given line at a given offset inside the sector.

During a search, disk data is interpreted according to the encoding selected. If you selected a search mode without letter case matching, not only case but also elements above the characters will be ignored.

After the search process is finished, the current position will be moved to where a line was found, or will remain the same if no lines were found. You can search for the next line from the current position by selecting **Find next** item in the **Search** menu or by pressing `F3` key.

You can go to the necessary sector according to its absolute offset by selecting the **Go to…** line the **Search** menu (or by pressing `Alt+P` key combination). Selecting this line opens the **Go to…** dialog window.



Go to sector…

The transition is performed by entering absolute sector offset, or cylinder, head and sector numbers. The listed parameters are bound by this expression:

(CYL x HDS + HD) x SPT + SEC – 1,

Where CYL, HD and SEC are numbers of cylinder, head and sector in the CHS coordinates (Cylinder – Head – Sector); HDS is the number of heads per disk and SPT is the number of heads per track.

You can return to a sector from another one by selecting the **Back** item in the **Search** menu (or by pressing `Ctrl+Backspace` key combination).

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6.8 Working with Different Encodings

The main window of the program features a list of encodings available in Acronis Disk Editor. This list is shown closed and dropped down below.

The closed and dropped-down list of encodings

The list of encodings is intended for correct interpretation of hard disk sector contents. Selecting the necessary encoding, you will be able to view sector contents correctly. This is interpreted in the right part of the program's main window in the hex mode.

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Chapter 7. Working with Acronis OS Selector

7.1 General information

Acronis OS Selector is a powerful, reliable and easy-to-use boot manager that allows several operating systems on a single PC and lets you create different configurations for any OS installed. With Acronis OS Selector you can:

- Install several different operating systems on a single PC
- Load installed operating systems from any hard disk partition or boot the PC from bootable CD/DVD
- Load installed operating systems from under Windows
- Install several operating systems on a single partition
- Hide or protect with a password any operating system on your PC
- Duplicate installed operating systems and define different configurations for each copy

7.2 Starting the work

After Acronis OS Selector is installed together with Acronis Disk Director Suite, all operating systems that exist on the given PC will be automatically located and added to the boot menu. The software will also automatically set the parameters and properties for every OS found (see section 7.7 «Setting operating system properties».

You can run Acronis OS Selector by clicking the respective item in the **tools** section of the Acronis Disk Director Suite **main window** sidebar or in the **main menu**.

- Acronis OS Selector can also be run as a separate application by clicking **Start → Programs → Acronis → Disk Director Suite → OS Selector**

You can control Acronis OS Selector in two ways:

- From its **main window** under Windows
- From the Acronis OS Selector **boot menu** invoked at bootup before the operating system is booted. The boot menu has the same interface and structure as the main window.

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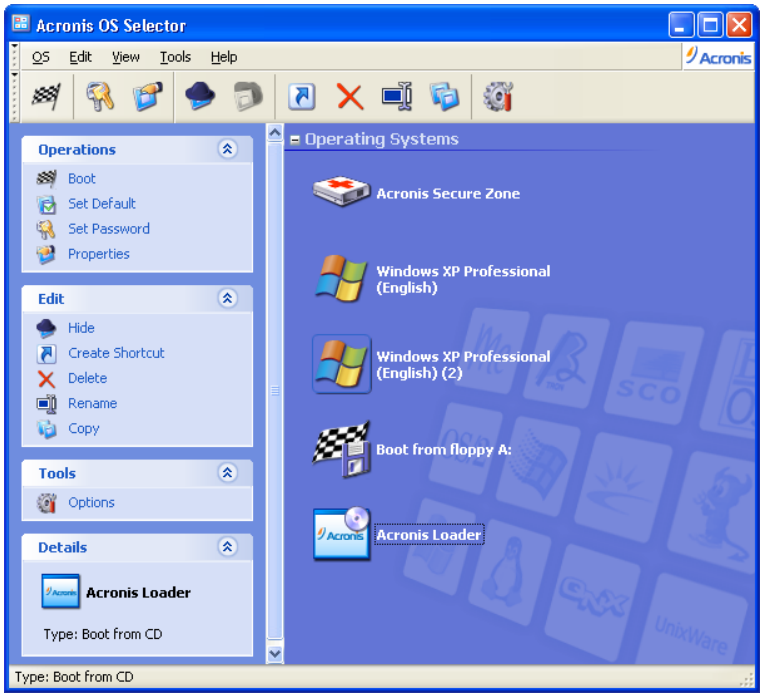

Acronis OS Selector Main Window

The key part of the main window, **Operating systems**, contains a list of operating systems available for loading on this PC. Acronis OS Selector automatically determines all operating systems installed and lists them in the **boot menu** at PC bootup and in the Acronis OS Selector **main window** under Windows. If you insert a bootable CD/DVD, it will be detected and displayed in the boot menu/main window as well. The CD/DVD can contain an operating system or any bootable program – in all cases, you will see a new icon in the operating systems area.

The left part of the window (the sidebar) contains the following sections also available in the **main menu** and customizable **toolbar**:

Operations

This section includes actions available for selected operating systems or their shortcuts (see section 7.9 «Using shortcuts»).

- **Boot** – boots the selected operating system or its configuration (shortcut)
- **Set Default** – sets the default operating system
- **Set password** – protects the selected operating system with a password
- **Properties –** sets properties of the selected operating system

Edit

This section provides the following means of operating system and shortcut management:

- **Hide –** hides a selected operating system or shortcut from the boot menu
- **Create Shortcut** – creates a shortcut for a selected operating system

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- **Delete** – deletes a selected operating system or shortcut
- **Rename** – renames a selected OS or shortcut
- **Copy –** duplicates a selected OS or shortcut

Tools

- **Activate OS Selector** – select to always display Acronis OS Selector boot menu at bootup
- **Deactivate OS Selector**– select to always boot up the specified operating system
- **OS Detection Wizard –** invokes OS Detection Wizard for detecting deleted or not-determined-automatically operating systems
- **Options** – sets Acronis OS Selector options

Details

This section provides brief context help on the selected operating system or its shortcut.

7.3 Setting the Boot Menu

After Acronis OS Selector is installed, the **boot menu** is automatically activated.

If your CD/DVD drive is set as the first bootup device in BIOS, a bootable CD/DVD inside the drive may prevent OS Selector from starting at bootup and force loading its own bootable program or OS. We highly recommend that you set the system bootup sequence in BIOS so that the HDD will be the first device.

To prevent the Acronis OS Selector boot menu from being invoked at bootup, select **Deactivate OS Selector** in the **Tools** section of the Acronis OS Selector **main menu** under Windows or in the respective **boot menu** section at PC bootup. Then you will be prompted to select an operating system to be booted after the **boot menu** is **deactivated**.

You can avoid appearing the Acronis OS Selector boot menu at bootup even if OS Selector is active. To do so, press **F6** immediately after turning on the computer, before the first messages will appear on the screen. This will boot an OS from the partition that is active, according to Master Boot Record (MBR).

7.4 Booting operating systems

You can boot any operating system with Acronis OS Selector:

- From the **boot menu** (if activated)
- From under Windows from the Acronis OS Selector **main window**

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7.4.1 Booting an OS using the boot menu

Having turned on the PC, wait for the Acronis OS Selector **boot menu** to be invoked and select and double-click an operating system to boot.

You can also boot a selected OS by:

- Clicking **Boot** in the **Operations** section of the **boot menu** sidebar
- Clicking **Boot** on the **toolbar**
- Selecting **Boot** in the **OS** section of the **main menu**

7.4.2 Booting OS from the Acronis OS Selector main window

With Acronis OS Selector, you can boot an available operating system from under Windows by:

- Running Acronis OS Selector
- Double-clicking the operating system icon in the central part of the **main window**

You will be prompted to reboot. Click **OK** to confirm and continue.

If you select the same operating system you are in at the moment, the PC will reboot after your confirmation.

You can also boot the selected OS using:

- The **Boot** button in the **Operations** section of the **Main Window**
- The **Boot** button on the **toolbar**
- The **Boot** item in the **OS** section of the **main menu**

7.5 Setting an operating system as the default

Any operating system can be **set as the default**. This means it will already be selected when the boot menu is invoked.

If you install a new operating system after Acronis OS Selector installation, it will be set as the default automatically.

You can set an operating system as the **default** by clicking **Set default** in the **Operations** section of the sidebar or the respective item in the **OS** section of the **main menu**, or the respective item of the context menu invoked by a right-click.

7.6 Setting operating system passwords

If needed, you can protect any installed operating system with a password to prevent its unauthorized booting.

To set a password:

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- Select an OS to protect
- Click **Set Password** in the **Operations** section of **main window** sidebar
- Enter and confirm a password in the **Set Operating System Password** dialog and click **OK**

An operating system password must be at least six characters long.

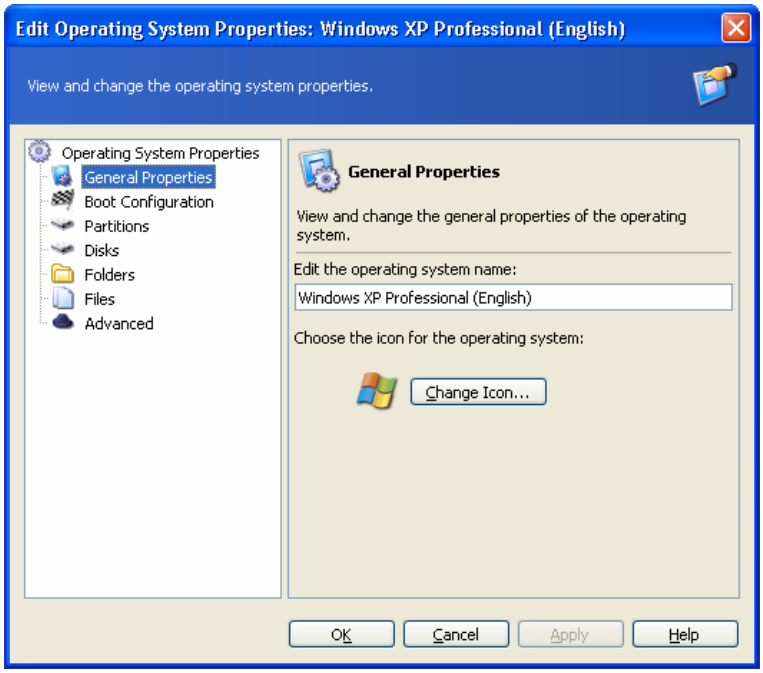
You can also set an operating system password by clicking **Set Password** on the **toolbar**, in the **OS** section of the **main menu**, or in the context menu, invoked by a right-click.

7.7 Setting operating system properties

Acronis OS Selector automatically determines properties of all operating systems installed on a PC. If needed, you can set them by manually clicking **Properties** in the **Operations** section of the **main window** sidebar, **boot menu**, the respective **main menu, toolbar or** context menu items. You can set the following properties:

7.7.1 General Properties

This section allows you to change the name and icon for any operating system listed in the boot menu.



General properties window

7.7.2 Boot configuration

This section allows you to set the following boot parameters:

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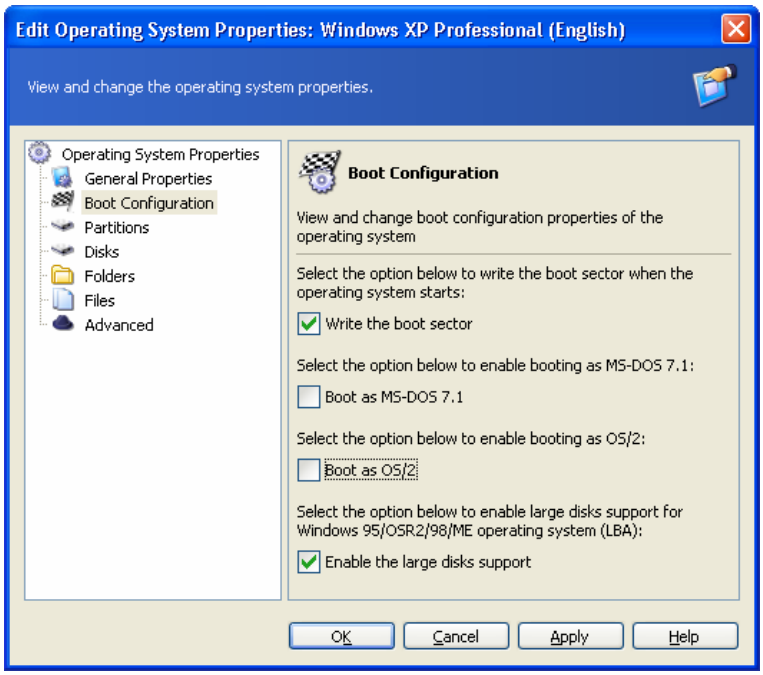
- **Write Boot Sector –** write boot sector each time an operating system boots
- **Boot as MS-DOS 7.1** – can be set for operating systems compatible with MS-DOS 7.1+ that were not automatically located by Acronis OS Selector
- **Boot as OS/2 –** can be set for operating systems compatible with OS/2 that were not automatically located by Acronis OS Selector
- **Enable large disks support** – enables large disks support for Windows 98/Me operating systems


Edit Operating System Properties: Windows XP Professional (English)
View and change the operating system properties.
Operating System Properties
General Properties
Boot Configuration
Partitions
Disks
Folders
Files
Advanced
Boot Configuration
View and change boot configuration properties of the operating system
Select the option below to write the boot sector when the operating system starts:
Write the boot sector
Select the option below to enable booting as MS-DOS 7.1:
Boot as MS-DOS 7.1
Select the option below to enable booting as OS/2:
Boot as OS/2
Select the option below to enable large disks support for Windows 95/OSR2/98/ME operating system (LBA):
Enable the large disks support
OK
Cancel
Apply
Help

Boot configuration window

7.7.3 Partitions

Acronis OS Selector allows you to hide hard disk partitions (except for the system). To hide a partition, select it and enable the **Hidden** option for it. This is not applicable to Windows 2000 partitions. You can perform this operation under that operating system using the **Advanced** section.

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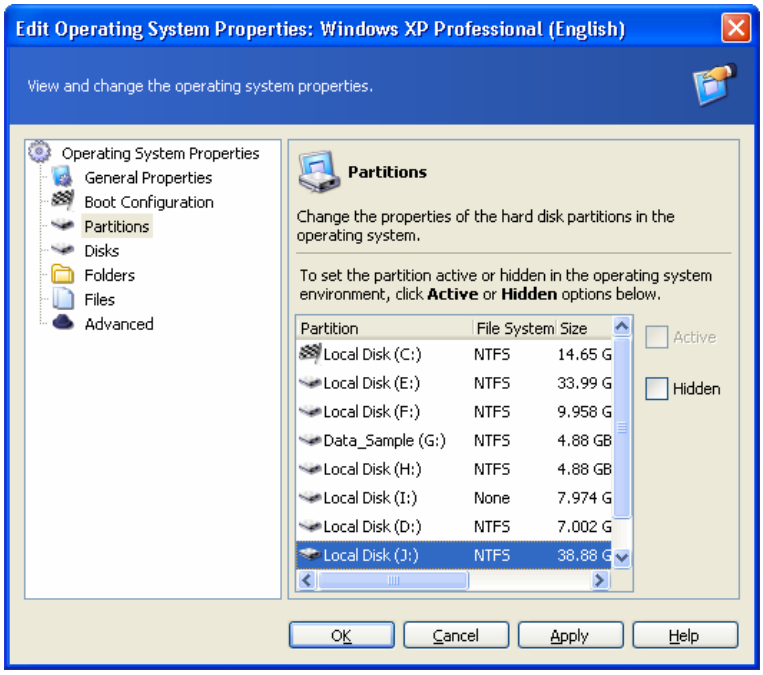

Partitions properties window

7.7.4 Disks

Generally, Windows can boot from HDD only if its boot files reside on the first (according to BIOS) hard disk (see details in 8.2.1 “General information”). If you connect a live system HDD, taken from another computer (where it was the first disk), to your computer, where it becomes the second (3rd etc.) disk, boot from that HDD will be impossible, even if the hardware is identical on both computers. OS Selector can manage situations like that and automatically set the disk order required for booting the selected operating system.

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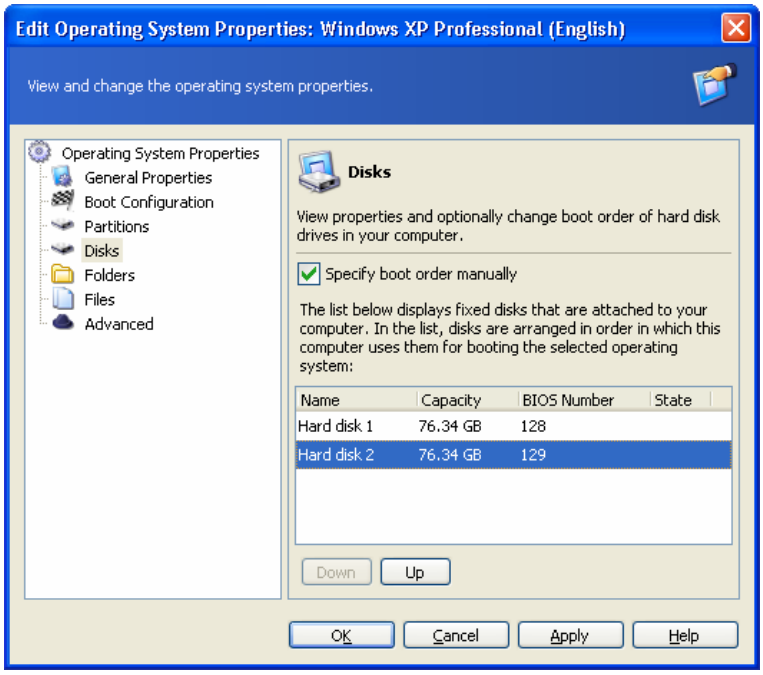

Disks properties window

Moreover, you can choose the disk order when installing a new Windows operating system so that its boot files are installed on the same disk where its main part resides (see 8.2.4 “Installing another Windows on a different disk”). Doing so makes operating systems on your first, second and so on disks fully independent. You will be able, for example, to boot from the second disk even if the first one is damaged or disconnected. You also will be able to individually back up and restore each system disk: every operating system will be bootable when restored to its disk.

Changing the disk order for an operation system already installed may prevent that system from loading.

7.7.5 Folders

Acronis OS Selector automatically determines system folders for all Windows operating systems. System folders contain files required for an operating system to work properly. Windows 98/Me/NT utilizes Windows and Program Files folders, while Windows 2000/XP uses the above plus Documents and Settings.

For other operating systems (e.g. Linux), you will have to specify system folders manually using the **Add** button. If needed, you can edit the list using the **Remove** button.

Under other operating systems (e.g., Linux OS), you can add folders to the system folders list only if host partitions are FAT16/32 or NTFS.

Each folder in the list has its **Properties** section which, with the help of the **Enable / Disable** parameter, allows you to specify if folder contents are to be restored at operating system bootup. This can help avoid conflicts among multiple operating systems, making them invisible to each other. For example, you will have to enable system folders recovery when installing another Windows on a partition where one Windows OS is

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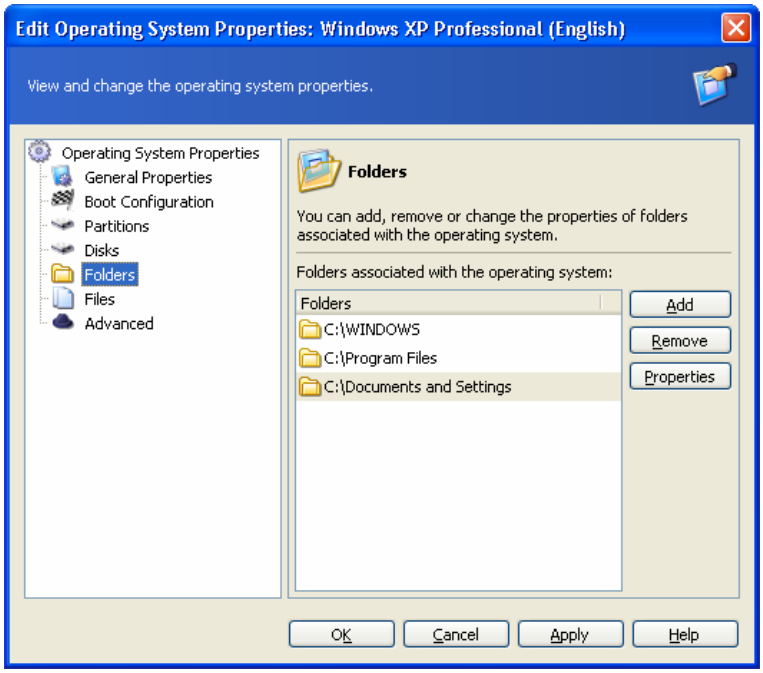
already installed (see 8.2.3 “Installing another Windows on the same partition”). When you copy an operating system using Acronis OS Selector **Copy** feature, the recovery option enables automatically.



Folders properties window

- **Enable** – enable folder contents recovery at bootup;
- **Disable** – leave folder contents as is.

7.7.6 Files

This section allows you to specify the location of system files required by the given operating system and edit these files. Examples of systems files might be **command.com**, **config.sys**, **msdos.sys**, and **autoexec.bat**.

For all Windows operating systems, the list of system files is populated automatically and can be changed, if needed.

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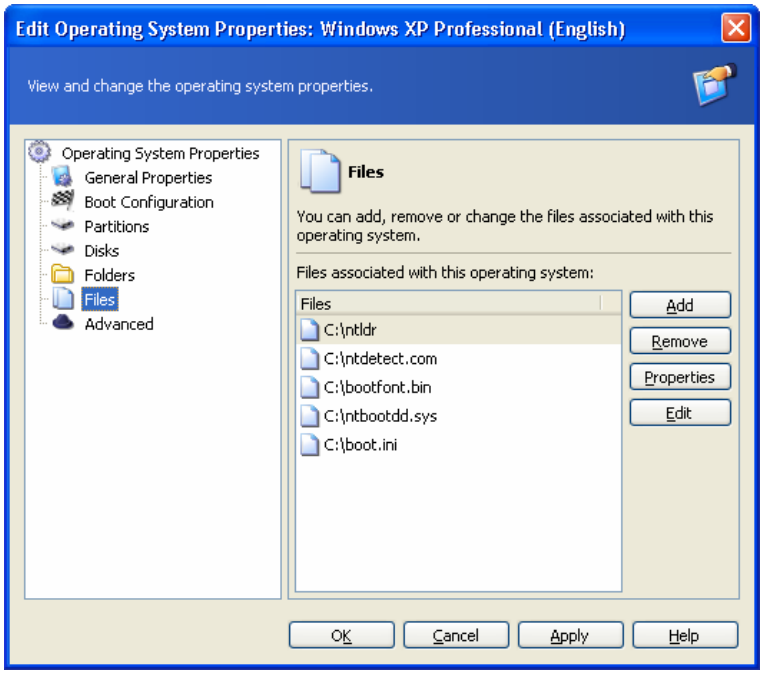

Files properties window

Properties of system files will provide you with the following options:

- Automatic **deletion** of a selected file with Acronis OS Selector under the given OS. Check **Yes, delete when the operating system starts** to enable the option. This might become necessary when two system files are in conflict, causing possible OS bootup problems.
- During installation, Acronis OS Selector automatically determines system files of any Windows versions and makes them **Changeable**. You can change this option manually if needed.
- For operating systems that use FAT16/FAT32 file systems (Windows 9x, DOS) the IO.SYS file must be located in the starting 2 KB of root folder. If you set a fragmentation limit for this file (in bytes), Acronis OS Selector will automatically defragment it when the limit is exceeded.

7.7.7 Advanced

You can't hide a partition under the Windows 2000 operating system just by setting Hidden options. To perform this operation, you will need to check the **Force hiding partitions** box available in this section.

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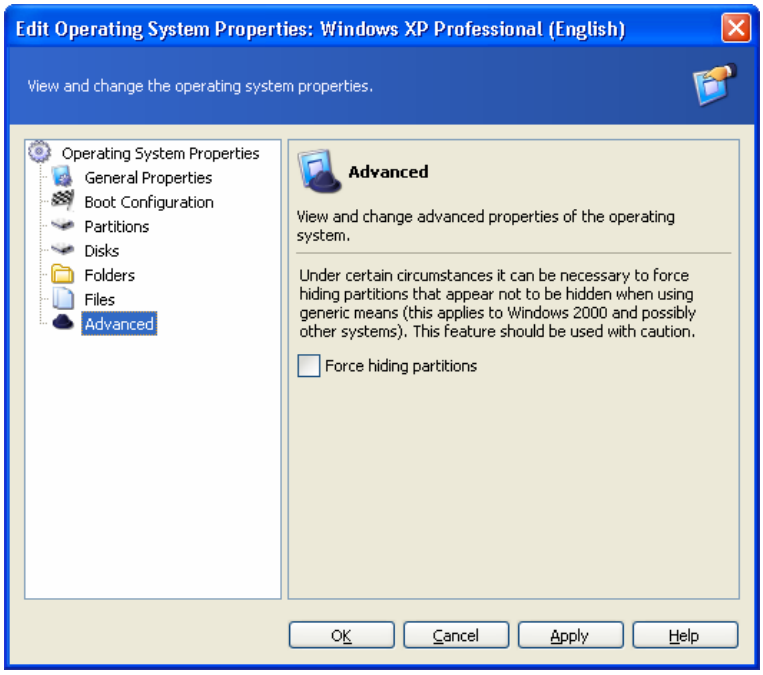
Edit Operating System Properties: Windows XP Professional (English)
View and change the operating system properties.
Operating System Properties
General Properties
Boot Configuration
Partitions
Disks
Folders
Files
Advanced
Advanced
View and change advanced properties of the operating system.
Under certain circumstances it can be necessary to force hiding partitions that appear not to be hidden when using generic means (this applies to Windows 2000 and possibly other systems). This feature should be used with caution.
Force hiding partitions
OK
Cancel
Apply
Help

Advanced properties window

7.8 Hiding operating systems

If needed, you can hide any operating system installed so it won't be shown in the **boot menu** and **Operating systems** section of the Acronis OS Selector **main window**.

To hide an operating system:

- Select an OS
- Click **Hide** in the **Edit** sidebar section, on the toolbar, or in the **Edit** section of the **main menu**. You can also hide an operating system using the context menu invoked by a right-click

This will hide the selected OS from the list of available ones.

To unhide an operating system:

- Select **Show Hidden** in the **View** section of Acronis OS Selector **main menu** to see the list of all hidden operating systems in the lower part of the **Operating systems** window
- Select an operating system and click **Unhide** in the **Edit** sidebar section or select the respective items of the **main menu** (**Edit** section) or the context menu

If there are other operating systems on this list, you can hide them again by unchecking **Show hidden** in the **View** section of the main menu.

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7.9 Using shortcuts

Acronis OS Selector allows you to create **shortcuts** for any operating system in the **boot menu**. Shortcuts enable you to create several different configurations for the same operating system.

Shortcut parameters are set in the same way as those of the operating system.

Shortcuts can be **copied**, **deleted** and **renamed** like operating systems.

You can create a shortcut for a selected operating system in the following ways:

- Clicking **Create shortcut** in the **Edit** sidebar section, **main window** toolbar or **boot menu**
- Clicking Create Shortcut in the Edit section of the main menu
- Clicking **Create Shortcut** on the toolbar
- Using a context menu invoked by a right-click

7.10 Deleting operating systems from OS Selector boot menu

With the **Delete** operation, you can delete any operating system from the OS Selector boot menu and main window along with its shortcuts.

You can delete all Windows system folders from the hard disk along with deleting Windows from the boot menu by checking **Delete the operating system directories** check-box in the Confirmation dialog window.

7.11 Detecting operating systems

The OS detection tool allows an unintentionally deleted from the boot menu operating system to be found and added to OS Selector boot menu and main window. Besides, if an operating system on a newly connected disk was not detected automatically, you can try to add it to the boot menu using this tool.

A deleted Windows operating system cannot be detected if its system folders have been deleted from the hard disk. A deleted Linux system cannot be detected if its loader was located in MBR.

- To run the **OS Detection Wizard**, select it from the **Tools** menu.
- Select whether you want to detect an OS on the hard disk, on CD, or to detect its record in the MBR.

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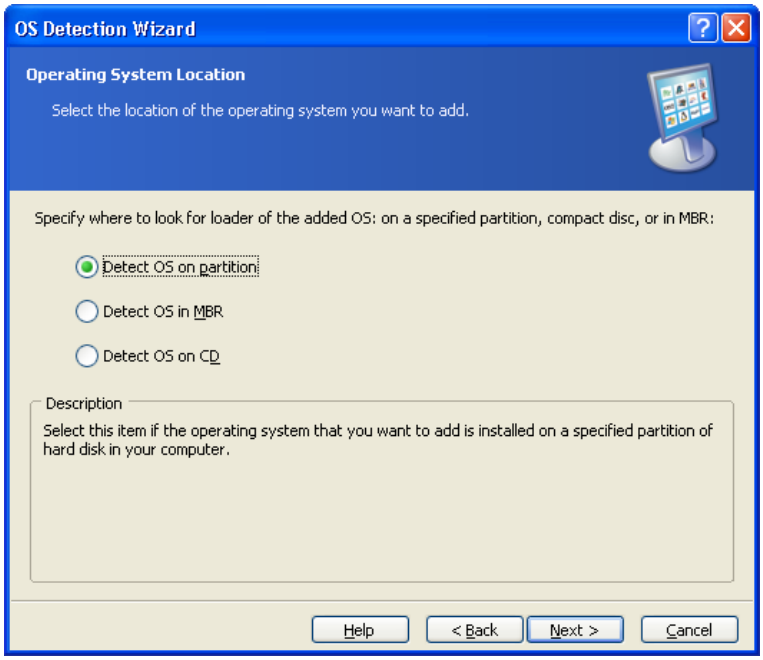
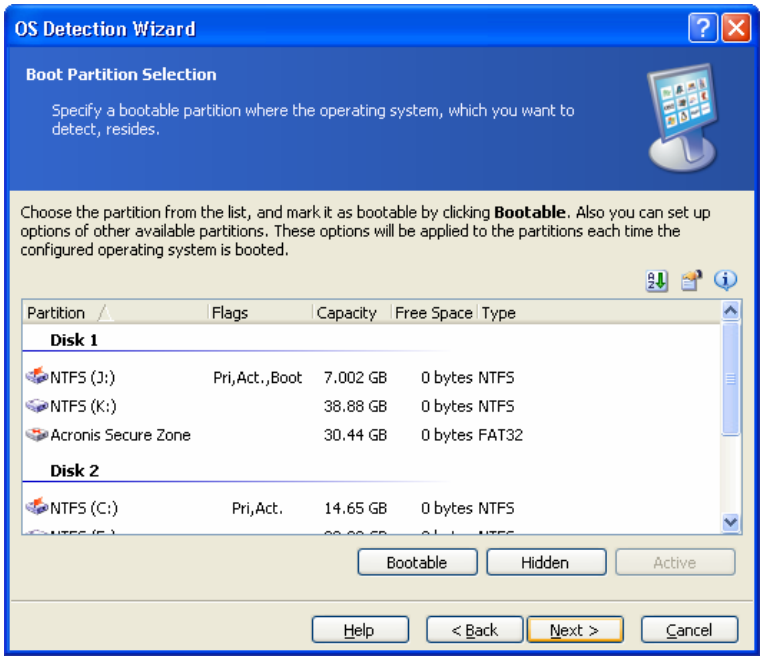

OS Detection Wizard
Operating System Location
Select the location of the operating system you want to add.
Specify where to look for loader of the added OS: on a specified partition, compact disc, or in MBR:
Detect OS on partition
Detect OS in MBR
Detect OS on CD
Description
Select this item if the operating system that you want to add is installed on a specified partition of hard disk in your computer.
Help
< Back
Next >
Cancel

Selecting where to search an OS

- If you selected the hard disk, select the partition where the OS (to be exact, its boot part) is located. When detecting Linux, choose the partition containing Linux loader. For Windows, see 8.2.1 “General information.” Then click **Bootable**.

  Whatever OS location is selected, you can set options of available partitions, for example, hide some of them. These settings will be applied to the partitions each time you boot the detected operating system.


OS Detection Wizard
Boot Partition Selection
Specify a bootable partition where the operating system, which you want to detect, resides.
Choose the partition from the list, and mark it as bootable by clicking Bootable. Also you can set up options of other available partitions. These options will be applied to the partitions each time the configured operating system is booted.
Partition
Flags
Capacity
Free Space
Type
Disk 1
NTFS (J:) Pri,Act.,Boot 7.002 GB 0 bytes NTFS
NTFS (K:) 38.88 GB 0 bytes NTFS
Acronis Secure Zone 30.44 GB 0 bytes FAT32
Disk 2
NTFS (C:) Pri,Act. 14.65 GB 0 bytes NTFS
Bootable
Hidden
Active
Help
< Back
Next >
Cancel

Selecting the partition where to search an OS

- If you selected **Detect OS in MBR** or on a FAT hard disk partition, select if you want to use **Boot sector on partition** or **Boot sector in file**. Generally, the first setting

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will be enough. Having selected the second, you will have to specify a path to the file, containing a previously saved boot sector of the detected operating system.

You can save boot sectors by means of Acronis Disk Editor. In addition, Windows sometimes creates boot sector copies itself. For example, Windows XP, being installed over Windows 98, creates bootsec.dos file, containing the Windows 98 boot sector.

- Next, you will see a list of detected operating systems. Click **Finish** to add them to the Acronis OS Selector boot menu and main window.

7.12 Renaming operating systems

Acronis OS Selector users can assign any name to operating systems or their shortcuts. That can be done by clicking **Rename** on the sidebar, toolbar, **main menu** or context menu.

7.13 Copying operating systems

Acronis OS Selector allows you to duplicate any installed operating system or its shortcut. It might be useful if you want to test unknown software before having it on main OS.

Copying an OS implies duplicating all its system files and folders and configuration files, as well as all programs installed, into a separate folder located inside the hidden system **BOOTWIZ** folder (see 1.3.2 «Acronis OS Selector installation»).

Copying can take a long time, so you will be prompted to confirm that you want to perform the task.

To copy an operating system, you need to:

- Select an operating system in the **boot menu** or program **main window**
- Click **Copy** in the **Edit** sidebar section or select a respective item in the **main menu** or context menu

After this, you will see a copy of this OS in the **Operating systems** window with a number automatically appended to its name, depending on the number of copies already made. If needed, you can rename a copy by clicking **Rename** in the **Edit** sidebar section or selecting a respective item in the **main menu** or context menu.

7.14 Setting Acronis OS Selector options

You can set Acronis OS Selector options by clicking **Options** in the **Tools** sidebar section or selecting a respective item on the Toolbar or **main menu.**

7.14.1 General options

Acronis OS Selector is able to protect system folders automatically when a new operating system is detected.

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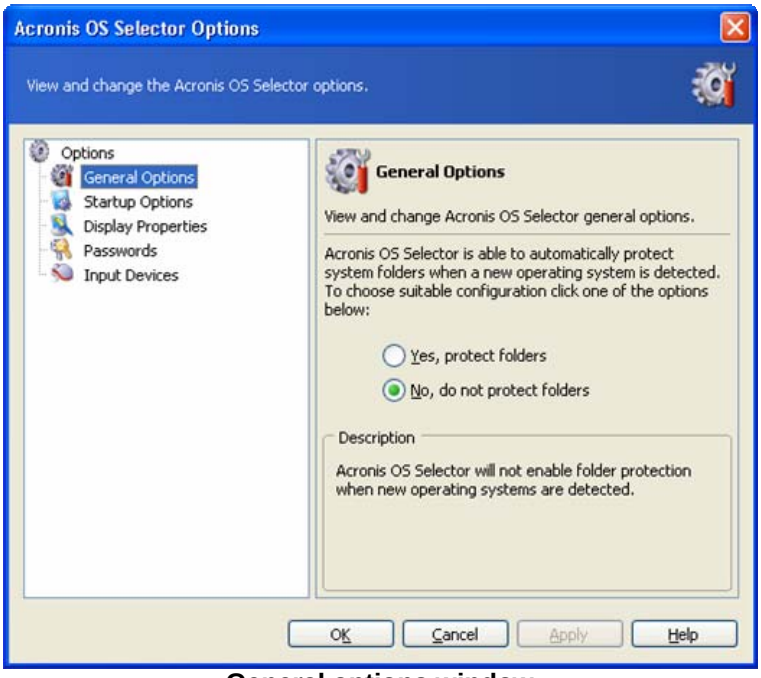
System folder protection is required when multiple OSes are on a single PC, especially in situations when several operating systems are located on the same hard disk partition.


Acronis OS Selector Options
View and change the Acronis OS Selector options.
Options
General Options
Startup Options
Display Properties
Passwords
Input Devices
General Options
View and change Acronis OS Selector general options.
Acronis OS Selector is able to automatically protect system folders when a new operating system is detected. To choose suitable configuration click one of the options below:
Yes, protect folders
No, do not protect folders
Description
Acronis OS Selector will not enable folder protection when new operating systems are detected.
OK
Cancel
Apply
Help

General options window

To choose a suitable configuration, click one of the options below:

- **Yes, protect folders** – folders protection will be enabled automatically when new operating systems are detected. Settings for the existing operation systems will be left intact
- **No, do not protect folders** – Acronis OS Selector will not enable folder protection when new operating systems are detected

7.14.2 Startup Options

In this section, you can set Acronis OS Selector bootup behavior:

- **At once (ESC for menu)** – if activated, Acronis OS Selector will boot the **default** operating system and you will have to press **Escape** to enter the **boot menu**
- **With timeout** – if activated, the default operating system will be booted after an interval (in seconds.)
- **Disable** – you will have to manually select an operating system from the **boot menu**. This is active by default

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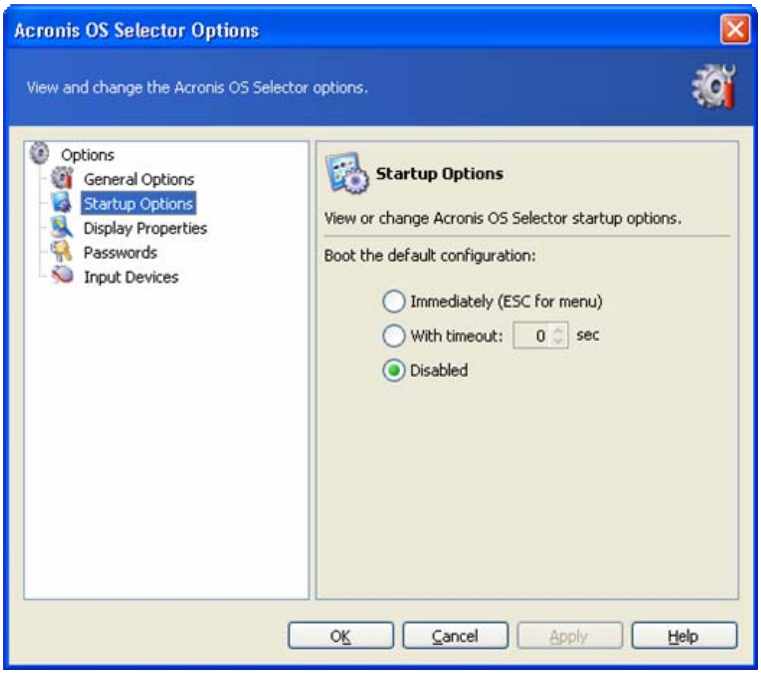

Startup options window

7.14.3 Display properties

Acronis OS Selector can control monitor video modes before Windows is booted and the graphics card and monitor drivers are loaded:

Display properties window

The following properties are available in the **Options → Display properties** section:

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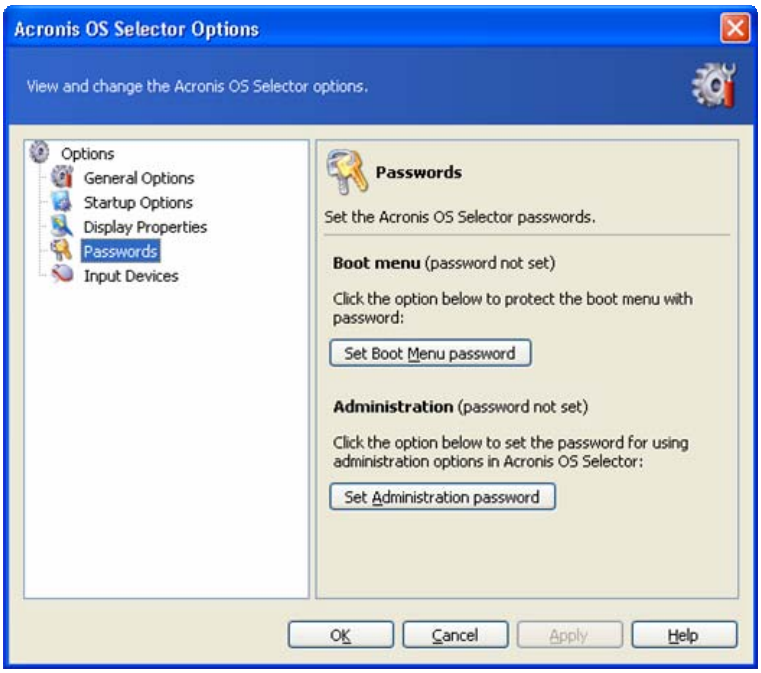
- **Resolution** – you can manually set the resolution you want, provided that it's supported by your graphics card and monitor and ranges from VGA (640 x 480) to SXGA (1280 x 1024.)
- **Bit depth** – you can set the number of colors displayed, choosing among **Low** (8-bit, 256 colors); **Medium** (16-bit, 65,536 colors); and **High** (24-bit, 16,777,216 colors.)
- **Refresh rate** – you can manually set the display refresh rate, which is set to 60Hz by default. If you select **Optimal**, the program will determine your graphics configuration automatically and set the maximum available refresh rate. The maximum rate that can be set manually is 150Hz

7.14.4 Passwords

You can set, change or remove Acronis OS Selector global passwords, including:

- Boot menu password – asked for each time Acronis OS Selector starts, except for cases when the boot menu is disabled to boot the **default** operating system immediately
- Administrator password – required when a user tries to change any options and settings of Acronis OS Selector and operating systems

To disable global passwords, leave both input fields blank.



Password properties window

When the **default** operating system is booted without invoking the boot menu, you might have to enter the boot menu password running Acronis OS Selector under Windows.

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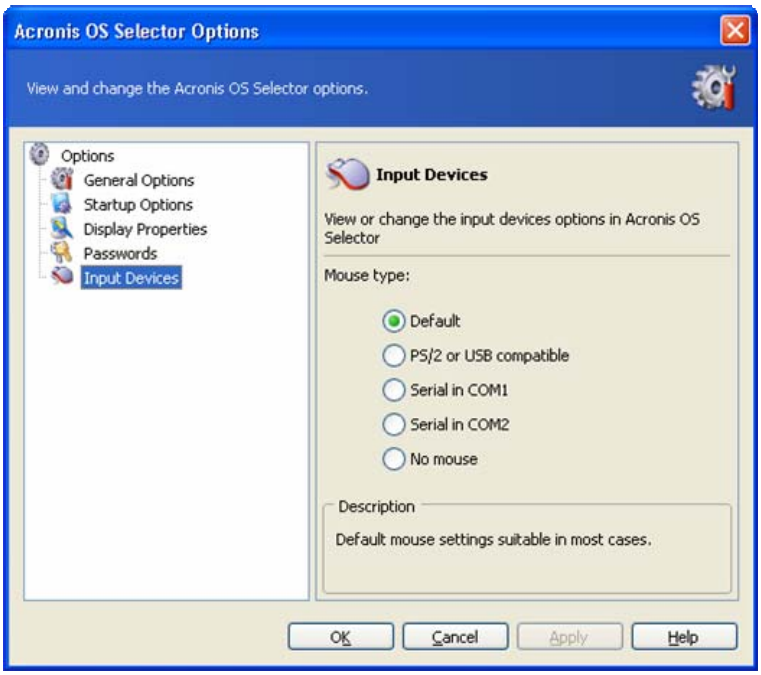
7.14.5 Input devices

In this section of Acronis OS Selector options, you can provide extended support of input devices (mouse, etc.) in Acronis OS Selector **boot menu**.

Using the **Default** parameter, the program automatically determines installed input devices.

If needed, you can manually specify an input device to use:

- Mouse or compatible device (touch pad, TrackPoint or its notebook analog) on PS/2 or USB
- Mouse on COM1
- Mouse on COM2
- Do not use mouse



Input devices properties window

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Chapter 8. Installing and using several operating systems on a single PC

8.1 Introduction

One of the key benefits offered by Acronis OS Selector is the ability to add almost any new operating system to a PC, even if it already has one or more operating systems installed. Using Acronis OS Selector, a user is able to install:

- Several different copies of the same OS (e.g. Windows XP);
- Different operating systems from the same developers (e.g. Microsoft Windows 98 and Windows XP);
- Operating systems from various developers (e.g. a Windows version and a Linux variant).

In all cases, Acronis OS Selector eliminates software conflicts that might affect operating system stability and even result in failures.

Acronis OS Selector supports and automatically recognizes the following operating systems:

- Various DOS environments: MS DOS 5.x–6.x; MS DOS 7.0 (not a separate product but is included in Windows 95); MS DOS 7.1 (not a separate product but is included in Windows 98); MS DOS 8.0 (not a separate product but is included in Windows Me). All Windows 9x and Windows NT operating systems: Windows 95/95 OSR2/98/Me/NT/2000/XP
- The most widespread Linux distributions
- The most widespread Unix PC distributions: FreeBSD, Solaris, QNX

Below, you will find instructions for some of the most typical situations related to adding a second OS to a PC that already has one installed. Please be aware that peculiarities of some operating systems may place additional limitations and/or require additional actions. We recommend that you look into Appendix B “Particularities of Operating Systems.”

Please note that a newly installed operating system will be set as the **default** in the Acronis OS Selector **boot menu**. If you require another OS to have this status, you will have to adjust the respective operating system properties (see 7.5 «Setting an operating system as the default»).

8.1.1 Reactivating the Acronis OS Selector boot menu

Because operating systems can change the Master Boot Record (MBR) during installation, Acronis OS Selector, which also uses the MBR, might become inoperable.

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If this happens, you won't have to reinstall Acronis OS Selector, but you will have to restore it by reactivating from a backup bootable disk (for more details see Chapter 9 «Bootable Media Builder»). After loading it, select **Activate OS Selector** in the **Tools** section of the main menu.

Besides, automatic reactivation is provided for Windows 98 operating system. To do this, Acronis OS Selector adds a REINSTAL.COM launch line into AUTOEXEC.BAT that restores Acronis OS Selector MBR code. Still, if this program doesn't do the thing correctly, you can reactivate Acronis OS Selector manually.

It's impossible to perform automatic MBR recovery under Windows Millennium Edition, as this OS has a feature-limited version of MS-DOS 8.0 that can't run programs from AUTOEXEC.BAT.

8.2 Installing several Windows copies to a single PC

8.2.1 General information

Any Windows operating system consists of two parts, **bootable** and **main**.

Windows 95/98/Me has the MS-DOS 7.0, 7.1, 8.0 operating system, respectively, as bootable, while **Windows NT/2000/XP** has NTLDR OS core loader (that is also a simple boot manager) that requires BOOT.INI configuration file NTDETECT.COM initial hardware detector (for more details see Appendix B «Particularities of Operating System».

The main part of Windows OS is located in Windows (or WINNT), Program Files, Documents and settings system folders that might be stored on any hard disk partition or even disk, while the bootable part is required to be located on the **first hard disk primary partition**.

The disk has to be the first, according to BIOS. This may vary from the enumeration several operating systems provide. If there are several disks in the PC, you can see their enumeration in the partition list in the Acronis Disk Director Suite main window. The disk number will be provided in the **WinNT4/2000/XP Number** column (to make it visible, right-click on column header line and check it.) The first disk in the system is numbered **0**.

Due to these bootable part location limitations, you can avoid problems with Windows only if you follow the installation order, according to which, older operating systems are to be installed first:

Windows 95 → Windows NT 4.0 → Windows 95 OSR2 → Windows 98 → Windows Me → Windows 2000 → Windows XP.

This operating system installation order solves boot problems. Otherwise, boot files of a newer OS will be damaged by those of an older version of Windows that knows nothing of its subsequent versions.

Acronis OS Selector breaks this limitation and eliminates the need to worry about Windows installation order.

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8.2.2 Installing another Windows on a separate partition

- Prepare a free primary partition for the new Windows system.

You can do this by using unallocated space (for partition creation instructions see 3.1 «Creating A New Partition» and 4.1.1 «Creating partitions»). If there's no unallocated space, you can free it by resizing respective partitions (see 4.1.4 «Resizing and/or moving a partition»).

Acronis Disk Director Suite allows conversion of free logical partitions into a primary (for more details see 4.2.2 «Converting a file system»). Still, you must remember that there can't be more than four primary partitions in a system.

- Set the prepared partition active for the new operating system.

When installing a new OS from CD, select the **CD** item in the **Operating systems** area of the Acronis OS Selector main window.

When installing a new OS from diskettes, create a new **Boot from floppy** item by selecting **OS → New → Boot from floppy** in the **Menu** line.

Then right-click on that item, select from the context menu **Operating System Properties → Partitions** and flag the partition you want the OS on as **Active**.

- Reboot and select your CD or floppy bootup from the boot menu, having inserted the disk with the OS distribution.
- Once booted from a disk, follow instructions to install the OS.

During installation, the Windows bootable part will automatically place itself on the primary partition you have previously set as active.

When you boot either version of Windows using Acronis OS Selector later, each OS in the list will recognize the partition where its bootable part is located as active.

8.2.3 Installing another Windows on the same partition

In some cases, a user might want to install several operating systems onto the same partition. This is usually not possible due to system files conflicts, and even operating systems from the same developer require different partitions for installation.

Acronis OS Selector enables you to avoid this restriction easily by protecting system files and folders of various OS from each other.

To install a new OS onto a partition where another operating system exists (some version of Windows: 98/Me or NT/2000/XP), you need to do the following:

- Select **Tools → Options → General options** and flag **Yes, protect folders**.
- In the active OS **Properties,** select **Folders** and enable the restoring of each system folder contents at system start (**Folders → Properties**, see 7.7.5 «Folders»).

After that, system files and folders of an existing OS will be stored in BOOTWIZ folder and made inaccessible for other OS installed.

- Reboot the PC to finish the configuration.

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- Now you can start installing a new OS in the ordinary way from a bootable diskette or CD or from under Windows.

8.2.4 Installing another Windows on a different disk

To install a new Windows OS onto a different disk, do the following.

When installing a new OS from CD, select the **CD** item in the **Operating systems** area of Acronis OS Selector main window.

When installing a new OS from diskettes, create a new **Boot from floppy** item by selecting **OS → New → Boot from floppy** in the **Menu** line.

- Then right-click on that item, select from the context menu **Operating System Properties → Disks** and set the target disk, where the new OS will be installed, to be the first.
- Reboot and select your CD or floppy bootup from the boot menu, having inserted the disk with the OS distribution.
- Once booted from a disk, follow instructions to install the OS.

By setting the target disk to be the first, you will force the boot part of Windows to be installed on that disk so that the new operating system could boot even if the first disk is damaged or removed. However, you may choose not to do it. The new operating system will then boot from the first disk, in spite of its system folders residing on another disk.

8.2.5 Installing additional Windows copies

In some cases, you might need to install two copies of the same Windows OS (e.g. two or more Windows XP copies, each having its own properties and application sets).

The first way to do it is to use one of the methods described above. These imply a complete OS installation.

The second way is simpler: operating system duplication using the **Operating system copy** feature described in detail in section 7.13 of this guide. The program will fully duplicate contents of Windows, Program Files and Documents and Settings folders, including all software installed, into the **Bootwiz** folder. You will be able then to remove unneeded applications from each of the systems.

However, keep in mind that the **Copy** feature does not allow copying an operating system onto a specified disk or partition.

8.2.6 New Operating System Wizard

If you installed a new copy of Windows NT/2000/XP on your PC, the **New Operating System Wizard** will help you set up its properties when you run **Boot menu** of Acronis OS Selector for the first time.

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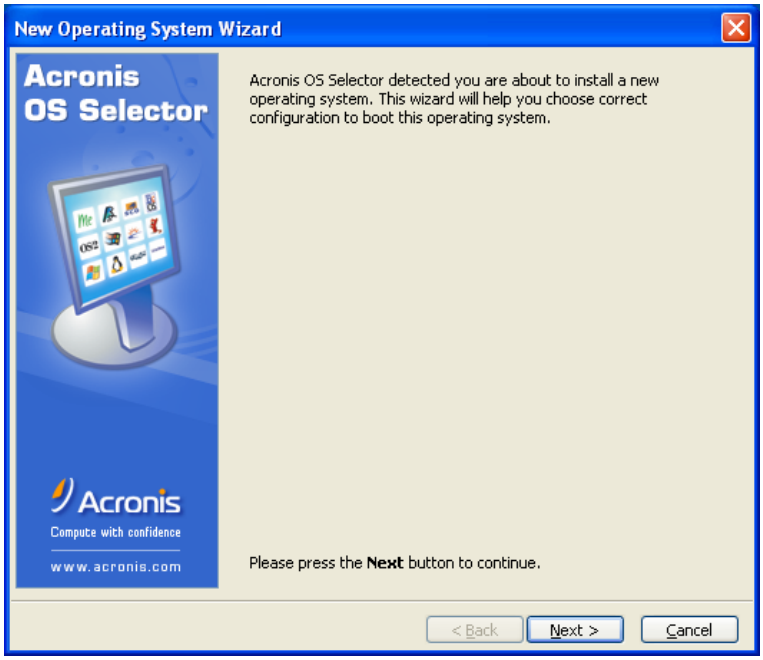
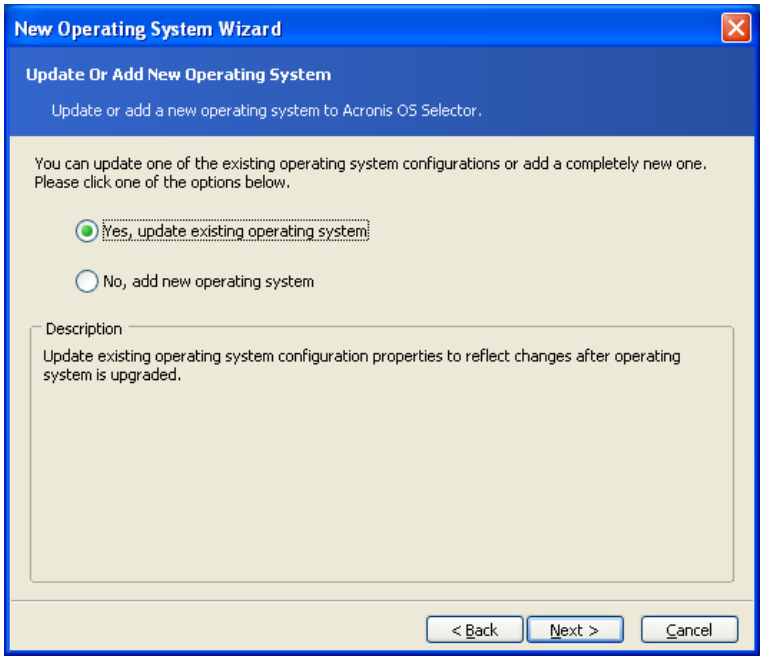

New Operating System Wizard
Acronis
OS Selector
Acronis OS Selector detected you are about to install a new operating system. This wizard will help you choose correct configuration to boot this operating system.
Acronis
Compute with confidence
www.acronis.com
Please press the Next button to continue.
< Back
Next >
Cancel

New Operating System Wizard

Having installed Windows 2000 or Windows XP, you can either save or replace already-existing Windows versions. If you need to:

- Update an existing Windows version with a new copy of Windows 2000/XP, select **Yes, update existing operating system**. In this case, the New Operating System Wizard will automatically determine Windows versions available for update.
- Leave your existing Windows copies as is, select **No, add new operating system**. In this case, a new copy of Windows 2000/XP will be added to the list of available OSes in the Boot menu.


New Operating System Wizard
Update Or Add New Operating System
Update or add a new operating system to Acronis OS Selector.
You can update one of the existing operating system configurations or add a completely new one. Please click one of the options below.
Yes, update existing operating system
No, add new operating system
Description
Update existing operating system configuration properties to reflect changes after operating system is upgraded.
< Back
Next >
Cancel

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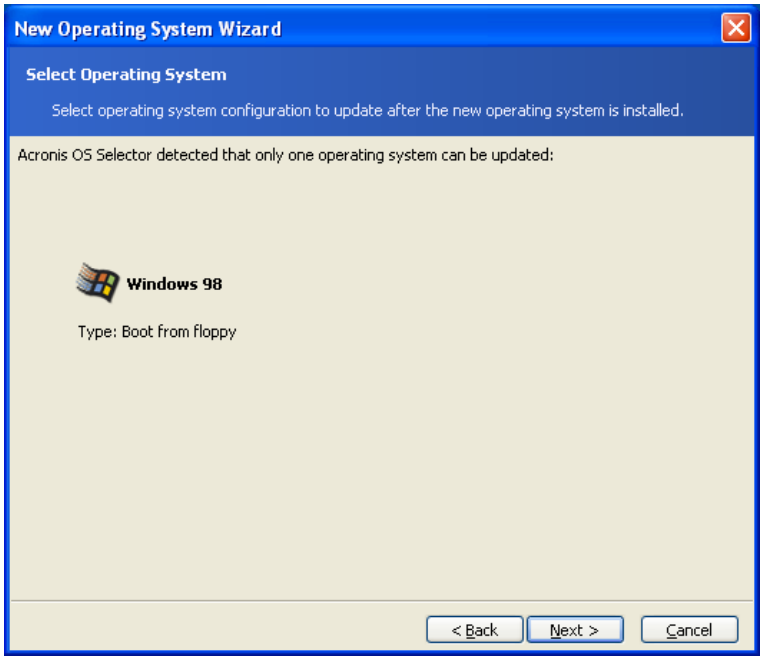
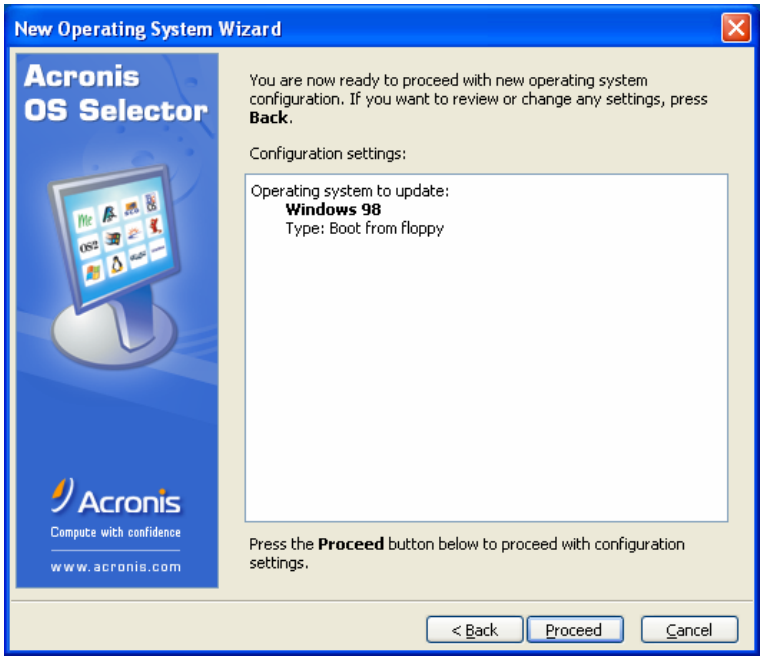
If you chose to update the existing OS, the **New Operating System Wizard** will automatically determine the list of operating systems installed available for update. In the list provided, select an OS to update by replacing it with a new copy of Windows 2000/XP.


New Operating System Wizard
Select Operating System
Select operating system configuration to update after the new operating system is installed.
Acronis OS Selector detected that only one operating system can be updated:
Windows 98
Type: Boot from floppy
< Back
Next >
Cancel

When a new OS is configured, click **Proceed** to confirm operations selected.


New Operating System Wizard
Acronis
OS Selector
Acronis
Compute with confidence
www.acronis.com
You are now ready to proceed with new operating system configuration. If you want to review or change any settings, press Back.
Configuration settings:
Operating system to update:
Windows 98
Type: Boot from floppy
Press the Proceed button below to proceed with configuration settings.
< Back
Proceed
Cancel

If Acronis OS Selector can't automatically determine the location of system folders, you will have to provide the information manually. System folders might be located on:

1) Any physical hard disks shown in the list
2) Any media unsupported by BIOS

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8.3 Installing Linux and Windows on the same PC

8.3.1 General information

The Linux operating system is a modern, reliable and high-performance platform for both business and home users. Since its popularity is growing, many Windows users are choosing to sample Linux; however, not all of them are willing to change operating systems completely or have a second PC on which to install Linux.

The preferred option is to run Windows and Linux on a single PC.

8.3.2 Linux peculiarities

From the perspective of bootup, Linux, like Windows, has two parts: 1) a loader that loads the Linux core into memory and passes it the controls; 2) an OS main part.

The most popular Linux loaders are Lilo and Grub.

The Linux main part is usually installed to an Ext2/Ext3 or ReiserFS file system partition that can either be primary or logical and can be located on any hard disk. This operating system needs another partition for its virtual memory (Linux Swap).

The Linux core is located in a file, which must be loaded into memory. Instead of supporting multiple file systems, Lilo developers went a simpler, more universal route: a loader just keeps the core file location in its data structure created by the special activator program, «lilo». As this program runs under Linux, it can locate any file on a disk by means of the operating system.

A disadvantage of such a mechanism shows up when moving or reducing the size of a Linux bootable partition. In such cases, Linux stops booting, so one has to have a Linux bootable diskette ready for loader reactivation.

8.3.3 Preparing partitions for Linux installation

Before you start installing Linux, you have to prepare partitions for it. Different Linux distributions may require a different partition structure, so you will have to follow installation instructions of your specific distribution.

Acronis Disk Director Suite provides the easiest mechanism for preparing partitions for further use, containing everything necessary for Linux file systems and partitions (see 3.1 «Creating A New Partition» and 4.1.1 «Creating partitions»). If there's no unallocated space, you can free it by resizing respective partitions (see 4.1.4 «Resizing and/or moving a partition»).

Experienced Linux users can create partitions manually by means of their specific OS installers.

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8.3.4 Installing Linux

Having created partitions, you can start Linux installation from a bootable CD with Linux distribution or diskettes created from images usually located on the first installation CD.

As Linux is installed only into partitions prepared for it, there's no need to create any special properties for the new OS to hide or change status of any partitions.

After selecting the loader location, you will have to remember that once placed into the MBR, it will overwrite the Acronis OS Selector boot record, making it inoperable until reactivated from a bootable CD or diskette (see 8.1.1 "Reactivating the Acronis OS Selector boot menu.")

After Linux is installed, Acronis OS Selector will automatically detect its presence and create a respective customizable icon in the **Operating system** area of the main program window.

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Chapter 9. Bootable Media Builder

9.1 General information

There are situations in which you might have to run Acronis Disk Director Suite without booting either operating system:

- in order to reactivate Acronis OS Selector after installing a new operating system
- in order to use Acronis Disk Director Suite on a non-Windows system, for example, a Linux-based PC
- if you do not often use Acronis Disk Director Suite and therefore do not want to install it on the computer

Acronis Disk Director Suite has a standalone bootable version that can run from CD or other removable media without booting an operating system. If you purchased the boxed product, you already have such a bootable CD, because the installation CD contains, besides the program installation files, the Acronis Disk Director Suite standalone bootable version.

If you purchased Acronis Disk Director Suite on the Web, you can create bootable media using the Bootable Media Builder. For this, you will need a CD-R/RW blank, several formatted diskettes (the wizard will tell you the exact number), or any other media your PC can boot from, such as a Zip drive.

If you have chosen not to install the Bootable Media Builder during Acronis Disk Director Suite installation, you will not be able to use this feature.

Acronis Disk Director Suite 10.0 also provides the ability to create an ISO image of a bootable disk on the hard disk. If there is a PXE server in your local network having the Acronis PXE agent installed, its administrator can save the bootable data on this server as well. Then any networked computer will be able to boot the Acronis Disk Director Suite standalone version.

If you have other Acronis products, such as Acronis True Image, installed on your computer, you can include standalone versions of these programs on the same bootable disk as well.

9.2 Creating bootable media

1. Run the Bootable Media Builder from the **tools** section of **main window** sidebar or from the respective main menu section.

2. Select which components of Acronis programs you want to place on the bootable disk.

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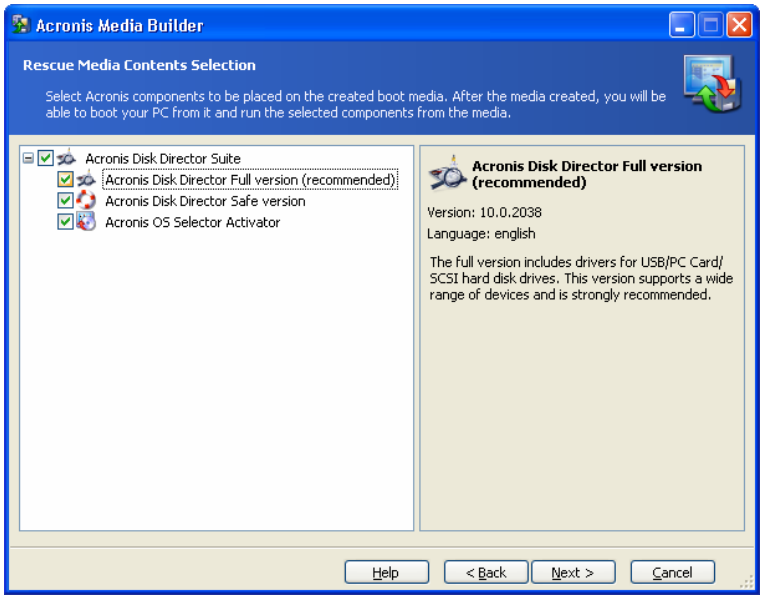
Acronis Media Builder
Rescue Media Contents Selection
Select Acronis components to be placed on the created boot media. After the media created, you will be able to boot your PC from it and run the selected components from the media.
Acronis Disk Director Suite
Acronis Disk Director Full version (recommended)
Acronis Disk Director Safe version
Acronis OS Selector Activator
Acronis Disk Director Full version (recommended)
Version: 10.0.2038
Language: english
The full version includes drivers for USB/PC Card/ SCSI hard disk drives. This version supports a wide range of devices and is strongly recommended.
Help
< Back
Next >
Cancel

Selecting components to place on the bootable media

Acronis Disk Director Suite offers the following components:

- **Disk Director full version**

  Includes support of USB, PC Card and SCSI interfaces along with the storage devices connected via them, therefore is highly recommended.

- **Disk Director safe version**

  Doesn't include USB, PC Card, or SCSI drivers. Recommended for use in case of problems with running **Full** version.

- **Acronis OS Selector Activator**

  In some situations, you will need to reactivate the Acronis OS Selector boot menu. For example, after installing the Windows operating system that overwrites the hard disk Master Boot Record and thus prevents invoking Acronis OS Selector at bootup. To solve this problem, just reactivate Acronis OS Selector using a bootable disk.

To find more about components of other Acronis products, see the respective user guides.

3. Select the type of bootable media (CD-R/RW or 3.5" diskettes) to create. If your BIOS has this feature, you can create other bootable media such as removable USB flash drives. You can also choose to create a bootable disk ISO image or save bootable data on the PXE server.

Having created an ISO disk image, you will be able to burn it onto any kind of DVD recordable, using DVD recording software. Creating a bootable DVD directly from Bootable Media Builder is impossible.

When using 3.5" diskettes, you will be able to write on a diskette (or a set of the diskettes) only one component at a time (for example, Acronis OS Selector Activator). To write another component, start Bootable Media Builder once again.

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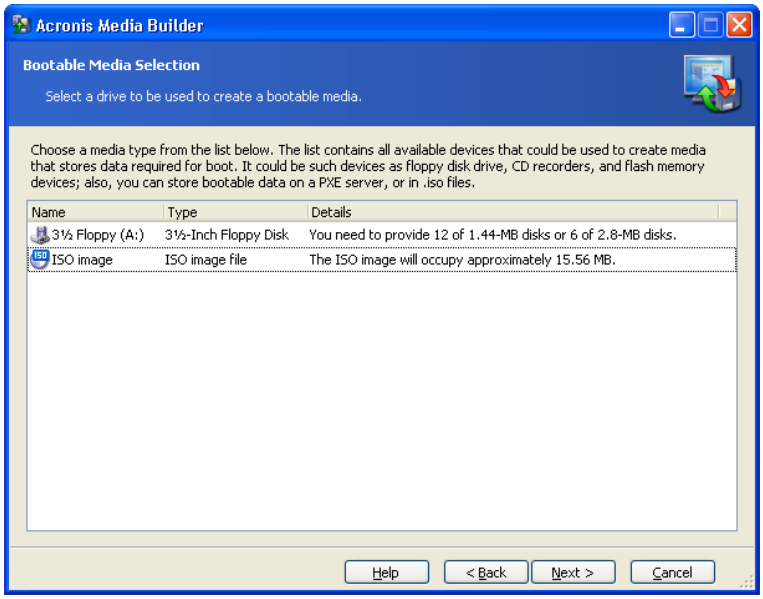
Acronis Media Builder
Bootable Media Selection
Select a drive to be used to create a bootable media.
Choose a media type from the list below. The list contains all available devices that could be used to create media that stores data required for boot. It could be such devices as floppy disk drive, CD recorders, and flash memory devices; also, you can store bootable data on a PXE server, or in .iso files.
Name
Type
Details
3½ Floppy (A:)
3½-Inch Floppy Disk
You need to provide 12 of 1.44-MB disks or 6 of 2.8-MB disks.
ISO image
ISO image file
The ISO image will occupy approximately 15.56 MB.
Help
< Back
Next >
Cancel

Selecting type of the bootable media

4. If you are creating a CD, diskettes or any removable media, insert the blank disk so the program can determine its capacity. If you chose to create a bootable disk ISO image, specify the ISO file name and the folder where to place it. If you chose to save bootable data on PXE server, specify the server and provide the user name and password to access it.

5. Next, the program will calculate how many blank disks are required (in case you have not chosen ISO or PXE) and give you time to prepare them. When you are finished, click **Proceed**.

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Appendix A. Hard Disk And File Systems

These appendices contain additional information about hard disk construction and data storage, partitions, file systems and interaction of operating systems with hard disks.

A.1 Hard Disk Organization

All hard drives have basically the same structure. Inside the case, there are several disks with a magnetic coating set on a single axis (spindle). A special motor provides the necessary rotation speed to the spindle, e.g. 5,400 rpm, 7,200 rpm, or 10,000 rpm.

Information on disks resides on concentric **tracks**. Each track has a number. The outermost track is number 0, and the numbers grow inwards.

Each of the tracks is divided into **sectors** that contain minimal information blocks that can be written to the disk or read from it. Sectors also have numbers. On every disk, there is a marker that indicates the beginning of sector enumeration. The sector that is the closest to this marker is number 1.

At the beginning of a sector, there is a header (prefix portion) that marks the beginning of the sector and its number. At the end of a sector in the suffix portion, a checksum is used to check data integrity. The data area between the prefix and suffix portions is 512 bytes in size.

Both sides of each disk on the spindle are used to store data. All tracks that have the same number on all the surfaces of all disks comprise a **cylinder**. For each work surface of a disk in the drive, there is a **head** that enables reading and writing data from/to the disk. Heads are assembled into a block and are numbered, starting with 0.

To perform an elementary read or write operation, the head block should be positioned at the necessary cylinder. When the appropriate sector (with the appropriate number in the service area) of the rotating disks approaches the head, data is exchanged between the head and the electronic circuit board of the disk drive.

Sector structure of a hard disk is created via **low-level formatting** during which each of the tracks of the disk is marked up. This process generally takes place when the drive is manufactured.

Modern disk drives usually contain relatively few magnetic disks (1–2) to make the head block lighter and speed up access to sectors (a drive like this has 2–4 heads respectively).

There can be up to several tens of thousands of cylinders per disk. The greater the amount of data that can be stored on one side of a disk,, the more cylinders can be created on it and the larger the capacity of the disk.

This design has a lot of technical implementation peculiarities, but those issues are not germane to this explanation.

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A.2 Hard Disk Partition

After low-level formatting creates disk sectors, partitions must be created on the disk.

A **partition** is an area on a hard disk that can be used to install an operating system and/or used as data storage. Creating separate sections on a disk is called **partitioning**. (Think of slicing a pie into different pieces.) Disk partitions are analogous to separate, physical disk drives and do not depend on each other. In fact, each partition can contain its own operating system.

Different operating systems use **different data storage means — file systems**. The process of creating a partition file system is called **formatting**. Each partition can have its own file system.

Preparing a disk for use includes two stages: partitioning and formatting.

Partitioning is useful and often necessary because:

- Different partitions can have different operating systems — for example, Windows 2000, XP and Linux.
- Partitioning provides more effective disk space usage.
- Partitioning enables you to separate system files from user data, making personal information storage safer.
- Partitioning provides more effective hard disk maintenance. In particular, more effective data integrity control, file defragmentation and data backup.

A.3 Partition Types

There are three main partition types:

- Primary
- Extended
- Logical

Primary and logical partitions are the main partition types. Physical hard disks can contain **up to four primary** partitions or **up to three primary and infinite logical** partitions.

Partition information is stored in a special disk area – the 1st sector of 0 cylinder, 0 head, called the **partition table**. This sector is called the master boot record, or MBR.

The number of primary partitions on a disk is limited, because the partition table contains four records itself.

Extended partitioning supports additional division into logical partitions. The amount of logical partitions is unlimited.

Special programs perform partitioning; usually they can:

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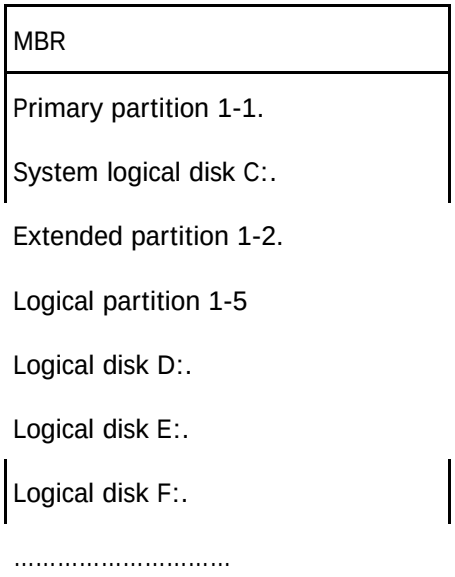
- Create a primary partition with a single logical disk
- Create an extended partition and divide it into logical partitions (disks)
- Set the active partition (a partition to boot an operating system from)

Typical hard disk partition structure can look like:



Usually, initial partitioning is made by means of an operating system. Different operating systems offer special programs for this.

After the installation of Windows XP, you can invoke the Control Panel, whose disk management tools will let you delete and create partitions (primary, extended, logical) using free (unallocated) disk space, or format a partition.

You cannot, however, change partition structure by means of the Windows operating system. To do this, you will need software such as Acronis Disk Director Suite. It lets you resize, move, hide partitions, set them as active, copy and perform other operations **without losing any data** or causing any OS and application workability problems.

A.4 Primary Partitions

A primary hard disk partition can contain the operating system, applications and user data (files). Only one primary partition can be set as active in a given PC session.

Most operating systems can boot from a primary partition only.

If you want to use several operating systems, you might have to create several primary partitions.

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A.5 Extended Partitions

The extended hard disk partition was developed as a way to avoid the four-primary-partitions limit. The extended partition is used only for creating a desired number of **logical partitions**.

An extended partition does not contain any data directly.

A.6 Logical Partitions

An extended partition can be divided into any number of logical partitions; these are similar to primary partitions in that they can contain operating systems, applications and user data.

Primary partitions should be used for booting operating systems, system files and folders.

Logical partitions can contain any other information, as they are accessible by most operating systems.

If you need several operating systems, you should use logical partitions for booting purposes and leave primary partitions free.

A.7 Formatting Hard Disks

Within each of the partitions, information has to be organized in a way understandable to the operating system using that partition. This organization is the **file system**.

As a rule, a formatting program performs the following functions:

- It creates the boot record
- It creates the file allocation table (FAT)
- It identifies and marks bad clusters on the disk so they are not ever used afterwards

After formatting, logical disks are organized as follows:

- Logical disks start with the boot sector
- One or several copies of the file allocation table (FAT) are placed after the boot sector
- A root folder is created
- The data area is created

Each logical disk has to be formatted with the FORMAT command separately.

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A.8 File Systems

The logical structure that has been created on the hard disk is supported by means of the operating system. The file system itself presents the information on the disk as an ensemble of **files** and **folders**.

For the user, a file is a unit of storage of logically connected information, including texts, graphics, and sound. For data storage organization, a file is a chain of connected sectors or **clusters**. A cluster is a unit of several sectors. (Sectors are characteristic for file systems supported by various versions of Windows.)

Operating systems support file systems on hard disks (or disk partitions) by allowing you to create, copy and delete files and folders.

At present, the most widely used file systems for PCs are the following two:

- FAT16/FAT32 (file allocation table) for DOS, OS/2 and Windows 95/98/Me/NT/2000/XP;
- NTFS (Windows NT file system) for Windows NT/2000/XP.

However, there are many other file systems. The Linux operating system, which is now gaining popularity, widely uses three file systems:

- Ext2 is a file system for end-users' PCs
- Ext3 is the default file system used by Red Hat Linux
- ReiserFS is a more secure (with respect to data integrity) file system that is used on data servers

A.9 File System Main Specifications

Operating systems allow you to work with data by supporting a **file system** on a disk partition.

All file systems contain structures required for data storage and control. These structures usually consist of an OS boot record, files and folders. A file system performs the following main functions:

1. Monitors used and free disk space (including bad sectors)
2. Maintains folders and file names
3. Monitors physical file location on a disk

Different operating systems use different file systems. One operating system may support only one file system; others may support several.

A.9.1 File system specification summary

Below is a summary of the most popular file systems. Each system is briefly discussed. This information can help you work with Acronis Disk Director Suite.

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Table 1. Windows file systems.

File system	FAT16	FAT32	NTFS
Operating systems	Almost all	Windows 95OSR2/98/Me, 2000/XP, Linux	Windows NT/2000/XP, Linux (for reading)
Max. partition size	4 GB (2 GB for Windows 95OSR2/98/Me)	2 TB	16 EB
Max. file size	Limited by partition size	4 GB	Limited by partition size
Max. file-name length	255	255	32767
Restoration (logging)	No	No	Yes
Max. files in root	Set at formatting	Unlimited	Unlimited
Max. clusters/blocks	$\sim 2^{16}$	$\sim 2^{28}$	$\sim 2^{48}$
Cluster/block size	512 Bytes – 64 KB	512 bytes – 64 KB	512 bytes – 64 KB
File record table/I-node	No	No	Dynamic

Table 2. Linux file systems.

File system	Ext2	Ext3	ReiserFS
Operating systems	Linux	Linux	Linux
Max. partition size	16 TB	16 TB	16 TB
Max. file size	Limited by partition size	Limited by partition size	Limited by partition size
Max. file-name length	255	255	255
Restoration (logging)	No	Yes	Yes
Max. files in root	Unlimited	Unlimited	Unlimited
Max. clusters/blocks	$\sim 2^{32}$	$\sim 2^{32}$	$\sim 2^{32}$
Cluster/block size	1–4 KB	1–4 KB	4 KB
File record table/I-node	Set at formatting	Set at formatting	Dynamic

In case you've forgotten your computer engineering units: 1 Kbyte = 1024 Bytes, 1 Mbyte = 1024 Kbytes, 1 Gbyte = 1024 Mbytes, 1 Tbyte = 2^{10} Gbytes= 1024 Gbytes, 1 Pbyte = 2^{10} Tbytes= 1024 Tbytes, 1 Ebyte = 2^{10} Pbytes= 1024 Pbytes.

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A.9.2 FAT16

The FAT16 file system is widely used by DOS (DR-DOS, MS-DOS, PC-DOS, etc.), Windows 95/98/Me, Windows NT/2000/XP operating systems and is supported by most other systems.

Main features of FAT16 are the file allocation table (FAT) and clusters. The FAT is the core of the file system. To increase data safety, it is possible to have several instances of the FAT (there are usually two of them). A cluster is a minimum data storage unit in the FAT16 file system. One cluster contains a fixed number (some power of 2) of sectors. The FAT stores information about what clusters are free, what clusters are bad, and also defines in what clusters files are stored.

Maximum size of a FAT16 file system is **4 Gigabytes**, and the maximum number of clusters is 65,525, the largest cluster being 128 sectors. Usually the smallest possible cluster size is selected so that the resulting number of clusters is less than 65,526. The larger the partition size, the larger the cluster has to be. Most operating systems incorrectly perform with 128-sector clusters, thus reducing the maximum FAT16 partition size to **2 Gigabytes**.

Usually the larger the cluster size, the more disk space is wasted.

Table 3. The following table gives the approximate dependence of these losses versus the cluster size:

Partition Size	Cluster Size	Waste
<127 MB	2 KB	2%
128–255 MB	4 KB	4%
256–511 MB	8 KB	10%
512–1023 MB	16 KB	25%
1024–2047 MB	32 KB	40%
2048–4096 MB	64 KB	50%

Like many others, the FAT16 file system has a root folder. Unlike others however, its root folder is stored in a special place and is limited in size (standard formatting produces a 512-item root folder).

Initially, FAT16 had limitations to file names that could only be eight characters long, plus a dot, plus three characters of name extension. However, long name support in Windows 95 and Windows NT bypasses this limitation.

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A.9.3 FAT32

The FAT32 file system appeared in Windows 95 OSR2 and is also supported by Windows 98/Me and Windows 2000/XP. FAT32 grew out of FAT16. The main differences between FAT32 and FAT16 are 28-bit cluster numbers and more flexible root folder implementation, which is not limited in size. The reason for FAT32 is the necessity to support large (larger than 8 GB) hard disks and the inability to build any more complex file system into MS-DOS, which is still in the core of Windows 95/98/ME.

The maximum size of FAT32 file system size is **2 Terabytes**.

A.9.4 NTFS

NTFS is the primary file system for Windows NT/2000/XP. Its structure is closed, so no other operating system fully supports it. The main structure of NTFS is the master file table, or MFT. NTFS stores a copy of the critical part of the MFT to reduce the possibility of data damage and loss. All other NTFS data structures are special files.

Like the FAT, NTFS uses clusters to store files, but cluster size does not depend on partition size. NTFS is a 64-bit file system. It uses Unicode to store file names. It is also a journaling (failure-protected) file system, and supports compression and encryption.

Files in folders are indexed to speed up file search.

A.9.5 Linux Ext2

Ext2, one of the main file systems for the Linux operating system, is a 32-bit file system. Its maximum size is **16 Terabytes**. The main data structure that describes a file is an i-node. A place to store the table of all i-nodes has to be allocated in advance (during formatting).Linux Ext3

Officially introduced with Red Hat Linux version 7.2, Ext3 is the Red Hat journaling file system. It is forward- and backward-compatible with Linux ext2. It has multiple journaling modes and broad, cross-platform compatibility in both 32- and 64-bit architectures.

A.9.6 Linux ReiserFS

ReiserFS was officially introduced to Linux in 2001. ReiserFS overcomes many Ext2 disadvantages. It is a 64-bit journaling file system that dynamically allocates space for data substructures.

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Appendix B. Particularities of Operating Systems

B.1 DOS-type Operating Systems

B.1.1 Supported Versions

Acronis Disk Director Suite supports the following versions of DOS-type operating systems:

- MS-DOS 5.x–6.x
- MS-DOS 7.0 (not a separate product but is included in Windows 95)
- MS-DOS 7.1 (not a separate product but is included in Windows 95 OSR2/98)
- MS-DOS 8.0 (not a separate product but is included in Windows Me)
- PC-DOS 5.x–7.0
- DR-DOS 7.x

Acronis Disk Director Suite will detect MS-DOS 7.x/8.0 as a separate operating system only if it is not a part of the installed Windows operating system, but was instead installed on your computer with help of the SYS command.

Acronis Disk Director Suite recognizes the following special cases:

- MS-DOS 5.x–6.x or PC-DOS that has Windows 95/98/Me installed over it
- MS-DOS or PC-DOS that has Windows NT/2000 installed over it

Acronis Disk Director Suite may not support some DOS versions (for example the Japanese version). In these cases, system and configuration file lists should be edited (for example, font files should be added) to avoid conflicts between different copies of these operating systems.

B.1.2 Boot Sequence

DOS boot sequence consists of the following stages:

1. The boot sector (after being loaded into memory and receiving control) scans the root folder for the first DOS file. Upon finding one, it loads the first several sectors (the loader) into memory, assuming that they are positioned contiguously on the disk, and passes control to the loader.
2. The loader loads the rest of the first file (boot manager) into memory and launches the program.
3. The boot manager initializes the memory, scans the partition structure and assigns letters to partitions, defining the DOS boot partition on the way.

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4. Then the boot manager reads the DOS configuration file (CONFIG.SYS) and if it contains multiple configurations, displays a menu on the screen prompting you to choose one of them; otherwise it just reads the configuration and loads the indicated drivers and operating system parts from the second DOS file.
5. After the configuration file has been processed, the command interpreter (default COMMAND.COM) is loaded and executed. The command interpreter is a plain DOS program.

There are several differences between DOS versions from different vendors:

- MS-DOS 5.x–6.x and PC-DOS assume that their files should be the first ones in the root folder
- MS-DOS 5.x–6.x system files have names IO.SYS and MSDOS.SYS
- PC-DOS and DR-DOS 7.x system files have names IBMBIO.COM and IBMDOS.COM
- MS-DOS 7.x/8.0 has one large system file IO.SYS and MSDOS.SYS becomes a configuration file
- Letter assignment order differs for different DOS versions
- MS-DOS and PC-DOS assume the boot partition as the partition to which letter C: has been assigned
- The CONFIG.SYS command set differs for different DOS versions
- MS-DOS 7.x/8.0 starts WIN.COM instead of COMMAND.COM if the MSDOS.SYS file includes BOOTGUI=1
- MS-DOS 8.0 cannot function as a stand-alone operating system. CONFIG.SYS and AUTOEXEC.BAT files processing are blocked. It can only boot the Windows operating system. A special MS-DOS 8.0 version on the Windows Me boot disk can function as a stand-alone operating system, but a check is built into it so that it can only be booted from a diskette

B.1.3 System and Configuration Files

Here is the DOS system files list:

- IO.SYS (mandatory for MS-DOS)
- MSDOS.SYS (mandatory for MS-DOS 5.x–6.x)
- IBMBIO.COM (mandatory for PC-DOS)
- IBMDOS.COM (mandatory for PC-DOS)
- DBLSPACE.BIN (mandatory for MS-DOS 5.x–6.2)
- DRVSPACE.BIN (mandatory for MS-DOS 6.22–8.0)
- LOGO.SYS (optional for MS-DOS 7.x/8.0)
- COMMAND.COM (optional for all DOS versions)

Configuration files list:

- MSDOS.SYS (for MS-DOS 7.x/8.0)

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- WINBOOT.INI (alternative MSDOS.SYS)
- CONFIG.SYS (for all DOS versions)
- AUTOEXEC.BAT (for all DOS versions)

B.1.4 Limitations

Different DOS versions have the following limitations:

- Only MS-DOS 7.1/8.0 supports FAT32 along with the FAT16 file system
- Only MS-DOS 7.1/8.0 supports extended BIOS and hard disks larger than 8 GB – but only with FAT16 LBA, FAT32 LBA and EXTENDED LBA partitions. This can cause conflicts with other DOS versions that are installed on the same computer
- For MS-DOS, the boot partition should be the partition to which drive letter C: is assigned; otherwise the operating system's booting will not finish
- MS-DOS and PC-DOS have trouble accessing multiple primary partitions if the hard disk contains logical partitions that were not recognized by DOS

Due to the limitation of boot code in most DOS–like operating systems, their boot partitions should be located in the first 2 gigabytes of a hard disk.

B.2 Windows 95/98/Me

Under Windows 95/98/Me, booting always starts with MS-DOS, thus everything concerning MS-DOS 7.x/8.0 booting applies to Windows 95/98/Me as well.

B.2.1 Supported Versions

Acronis Disk Director Suite supports Windows 95 and Windows 95OSR2/98/Me and can detect their language version.

B.2.2 Booting Details and Limitations

Windows booting starts when MS-DOS executes the WIN.COM file. This program loads the Windows kernel that loads drivers, arranges memory allocation and starts the shell program (EXPLORER.EXE).

Drivers that were loaded rescan the partition structure and assign letters to partitions that were not visible from MS-DOS.

There are several differences between Windows 95/98/Me versions:

- Windows 95 contains MS-DOS 7.0, does not support FAT32 and due to MS-DOS 7.0 limitations, it cannot be booted from partitions that are located beyond the 1024th cylinder
- Windows 95 OSR2/98 contains MS-DOS 7.1 and supports FAT32
- Windows Me contains MS-DOS 8.0, which supports FAT32, but does not allow the use of MS-DOS

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B.2.3 System Folders

Main Windows parts reside in the following folders:

- System (its name can be assigned during installation, default name is «Windows»)
- Applications (in English and most Eastern Windows versions, its name is «Program Files», in other Western Windows versions, this folder has other names)
- Backup (available in Windows Me and is called «Restore»)

Acronis Disk Director Suite now supports multiple operating systems with folders with same names on the same partition. These folders are called system folders. A system folder is transferred to its proper location (to the root folder) only when this operating system is booted; other times it resides in the OS Selector system folder.

The above-mentioned folders are added to the system folders list automatically when an operating system is detected. You can always manually edit this list by running Setup from Boot Menu and editing the properties of the selected operating system. For example, sometimes it is useful to add the «Recycle» folder.

B.3 Windows NT/2000/XP

B.3.1 Supported Versions

Acronis Disk Director Suite supports Windows NT versions 3.51, 4.0, Windows 2000 and Windows XP; it can detect the most common language versions.

B.3.2 Booting Peculiarities

Operating systems based on Windows NT consist of two main parts: the boot part and the main part. These parts can reside on different partitions. The boot part consists of the operating system kernel loader NTLDR (which is also a simple boot manager), its configuration file (BOOT.INI) and initial hardware detection code (NTDETECT.COM). The partition where the boot part resides is called Windows NT/2000 boot partition.

The loader usually opens a simple menu from which you can choose Windows NT/2000 configuration or some other operating system whose boot sector is stored in a file.

Main Windows NT/2000 parts reside in the WINNT system folder (this can be assigned during installation) and in the application folder (Program Files usually), whose name cannot be changed. A partition where the main part of the operating system resides is called the system folder partition. Multiple operating systems of Windows 95/98/Me and Windows NT/2000 may conflict because of the application folder (see B.2.3 «System Folders»).

It is possible for several different Windows NT/2000/XP to be booted from a single loader.

B.3.3 System and Configuration Files

Windows NT/2000/XP system files list:

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- NTLDR (mandatory)
- BOOTFONT.BIN (mandatory for those language versions that use their own font)
- NTDETECT.COM (mandatory)
- NTBOOTDD.SYS (mandatory if the system folder partition cannot be accessed with usual BIOS hard disk access function)

Configuration files list:

- BOOT.INI (mandatory).

B.3.4 System Folders

The major parts of Windows NT/2000/XP reside in the following folders:

- System (its name can be set during installation, its default value is «Winnt»)
- Applications (in English and most Eastern Windows versions, its name is «Program Files», in other Western Windows versions, this folder has other names)
- Personal documents and settings (in English and most Eastern Windows versions, its name is «Documents and Settings», in other Western Windows versions, this folder has other names)

Because the application folder name cannot be changed, the ability of several operating systems to have folders with the same names on a partition was added to Acronis Disk Director Suite. Such folders are called system folders. A system folder is moved to its place (root folder) only when the corresponding operating system is booted, otherwise it remains in the OS Selector system folder.

The above-mentioned folders are added to the system folders list automatically when an operating system is detected. Nevertheless, you can always manually edit this list by running Setup from Boot Menu and editing the properties of the selected operating system. For example, sometimes it is useful to add the «Recycle» folder.

Acronis Disk Director Suite can manage the Windows NT/2000/XP system folders only if they reside on a FAT16/FAT32 partition.

B.3.5 Limitations

Different Windows NT/2000/XP versions have the following limitations:

- For any Windows NT/2000/XP version, the boot partition must be a primary partition of the first hard disk
- Windows NT versions 3.51 and 4.0 recognize the FAT16 and NTFS file systems, Windows 2000 also recognizes the FAT32 file system
- The boot partition of Windows NT version 3.51 and 4.0 must be located among the first 2 gigabytes of the hard disk

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B.4 Linux

Acronis Disk Director Suite automatically detects and supports any Linux distribution if it is booted by Lilo or ASPLoader installed in the MBR, or if it is booted by any loader installed in the boot sector of the Linux partition.

Usually Linux itself is installed on an Ext2, Ext3 or ReiserFS partition, which can be both primary and logical, and can be located on any hard disk. Linux also requires another partition to manage its virtual memory (Linux Swap).

Strictly speaking, the loader is not a part of an operating system. Its main function is to load the Linux kernel into memory and pass control to it. Since Lilo is the most common Linux loader, let us describe its work in more detail (ASPLoader works in a similar manner).

The Linux kernel is stored in a file, and the loader has to load it into memory. Instead of supporting multiple file systems where the kernel might be stored, Lilo developers chose a simpler and more universal way. The loader just stores the location of the kernel file in its data structures. These structures are created by a special activation program called «lilo», and the process itself is called «activation». Since this program is run from Linux, the features of the latter allow it to easily locate any file on a disk.

The disadvantage of such a technique manifests itself when a Linux partition is moved or reduced in size. In that case, Linux becomes unbootable, and a Linux boot floppy is required to reactivate the loader.

B.5 Other Operating Systems

Other operating systems are usually installed on their own file systems. They can have limitations to the location of the boot partition and support of other file systems. It is useful to know this information prior to installing a new operating system on the computer.

Acronis Disk Director Suite automatically detects even operating systems unknown to it, if they are booted from the boot sector.

Some modern operating systems have special means allowing them to be booted directly from Windows, among them BeOS and QNX.

We recommend that you do not use other partition management software that may be supplied with operating systems together with Acronis Disk Director Suite's OS Selector, since they frequently make incorrect changes to the partition structure. If you need to create a separate partition to install a new operating system, it is best to use Acronis Disk Director Suite's OS Selector Disk Administrator.

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Appendix C. Glossary

Absolute sector. All the sectors of a hard disk can be numbered sequentially, starting with zero. Such numbered sectors are called absolute.

Active partition. One of the primary partitions of a hard disk is usually active. Default MBR code tries to boot an operating system from the active partition of the first hard disk. Letter assignment in Microsoft operating systems depends on which partitions are active.

Bad cluster. A cluster that contains bad sectors. Such a cluster cannot store information, with possible corruption of the data.

Bad sector. A sector that cannot store the information written, for instance due to defects or aging of the magnetic surface.

Booting is a procedure that is executed every time a computer is turned on or an operating system finishes its work or when the reset button is pressed. Booting consists of the following stages:

- Hardware diagnostics
- Memory check
- Built-in BIOS initialization
- Initialization of additional hardware components and their BIOSes (video, SCSI etc.)
- Booting an operating system

If a boot manager is installed on a computer, it is booted instead of an operating system. Then the boot manager boots the user-selected operating system itself.

Boot record. The initial part of a partition that contains code and data necessary for booting an operating system. May consist of one or several sectors. The first sector of a boot record must end with the boot sector signature (0AA55h).

Boot sector is the first sector of a disk or a partition that contains the initial code for the operating system booting. The boot sector must end with the 0AA55h signature.

Bootable disk is a disk from which an operating system may be booted. A bootable disk must contain a boot sector of an operating system and the necessary system and configuration files. The «bootable disk» term usually refers to diskettes and CD-ROMs.

Bootable partition. A partition that can host an operating system. At the beginning of such a partition, there should be a boot record.

Cluster. Information storage unit in such file systems as FAT and NTFS. Every file occupies a certain number of whole clusters, so the greater the cluster size, the higher the losses due to file size adjustment, but the smaller the cluster the more space the cluster distribution tables occupy.

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Cylinder. A group of all the tracks on all the magnetic platters of a hard disk that can be accessed without moving the magnetic head. Access to the data inside one cylinder is much faster than moving the head from one cylinder to another.

Disc. A non-magnetic storage media (compact disc, CD-RW or DVD).

Disk. A magnetic storage media (floppy disk or hard disk). (Note: Disc and Disk are often used interchangeably.)

Drive. A general word that can mean both a device for accessing information on a disk (floppy disk drive) and a partition that can be accessed from an operating system (logical drive).

File. A file is named information storage in the file system. In different file systems, files can be stored in different ways, with different file names and different ways to write the full path to the file in the folder tree.

File allocation table (FAT). The hard disk area, located after the boot sector, which describes physical files locations; a duplicate for higher data storage reliability follows FAT.

The FAT also contains the disk cluster list, as well as many records as there are clusters on a disk. If a FAT cell contains «0», the cluster is empty. The last file cluster, defective cluster and reserved clusters have their own special markings.

The FAT describes each file by a chain of numbers — like serial numbers of a file's disk clusters. The number of the first cluster of each file is stored in the folder. Writing, deleting and modifying files and folders results in corresponding FAT changes.

File system. Data structure that is necessary to store and manage files. A file system does the following functions: tracks free and occupied space, supports folders and file names, tracks the physical positions of files on the disk. Each partition may be formatted with its own file system.

Folder. A table in the file system that contains a description of files and other folders. Such a structure allows creation of a folder tree that begins with the root folder.

Formatting. The process of creating a service structure on the disk. There are three levels of hard disk formatting: low-level (marking the magnetic surface with tracks and sectors), partitioning and high-level (creation of a file system on a partition).

Hard disk (hard drive). Fixed storage media along with integrated electronics that consists of several magnetic platters that rotate synchronously on one spindle. Hard disks have relatively high capacity and high read/write speed.

Hard disk geometry. A set of hard disk parameters that usually includes the number of cylinders, heads and sectors per track.

Head (magnetic head, read/write head). A hard disk consists of several magnetic platters; for each side of each platter, there is a head that is used to read and write information on it.

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Hidden partition. A partition that is somehow made invisible to the operating system. Usually partitions are hidden by changing their type.

Label. An optional name that can be assigned to a partition to simplify its identification. Usually has the same limitation as file names. For example, FAT partitions have labels up to 11 characters long, but may contain spaces.

Letter (of a drive, partition). All operating systems that are DOS-compatible use Latin letters to identify drives and partitions. Letters A: and B: are usually reserved for floppy drives. Starting with C:, letters are assigned to hard disk partitions that can be recognized by the operating system. Separate letters may be assigned to CD-ROMs, DVDs, or other disk drives, and to network drives.

Logical disk is a partition whose file system is recognized by the operating system. Usually each logical disk is assigned with a letter that uniquely identifies it.

Logical partition. Partition information that is located not in MBR, but in the extended partition table. The number of logical partitions on a disk is unlimited.

Master boot record (MBR) is located in the first sector of the first hard disk and stores information about the hard disk partitioning and code that is loaded with BIOS. All the actions that follow depend on the contents of this code.

Operating system is a set of programs that usually includes kernel, drivers, shell and system programs that are used for centralized hardware management and hiding the details of hardware management from the user and applications.

Operating system booting is initiated by loading its boot sector to memory at 0:7C00h address and passing control to it. Since every operating system has its own boot sector, it is able to perform all the necessary actions to load and initialize system and configuration files.

A boot manager usually supports multiple operating systems on one computer and even one partition, so it has to perform some preparatory actions (create the boot context) before booting an operating system.

Partition. An independent area on a hard disk where a file system can be located. A partition can be either primary or logical, depending on its position in the partition structure. One of the primary partitions of a hard disk may be active. A partition has the following attributes: type, beginning and size. Some partition management software and boot managers allow for the hiding of partitions. Information about partitions is stored in the partition table.

Partitioning. The process of creating the logical structure on a hard disk. Partitioning is usually done with programs such as FDISK — a component of DOS and Windows. Disk Administrator completely replaces FDISK where functionality is concerned and allows performance of many additional useful operations.

Partition structure. All the partitions on a hard disk make a tree with the root in the MBR partition table. Many operating systems and programs assume that any partition table but

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MBR can contain not more than one partition entry and one table entry. This simplifies the partition structure greatly – all the logical partitions form one chain.

Partition table. It is the table that contains the information about partitions and links to other partition tables. A partition table cannot have more than four entries. The main partition table is located in the hard disk MBR, and the other partition tables are called extended. Partition tables are usually stored in the first sector of a cylinder.

Physical disk. A disk that is physically a separate device. Thus, floppy disks, hard disks and CD-ROMs are physical disks.

Primary partition. The partition, information about which is contained in the MBR partition table. The majority of operating systems can be booted only from the primary partition of the first hard disk, but the number of primary partitions is limited.

Root folder. The folder where the folder tree of a file system begins. Starting from the root folder, one can uniquely describe the file position on the folder tree by sequentially naming all the intermediate nested folders, e.g.: \WINDOWS\SYSTEM\VMM32.VXD. Here the WINDOWS folder is a subfolder of the root folder, the SYSTEM folder is a subfolder of the WINDOWS folder, and the VMM32.VXD file is located in the SYSTEM folder.

Sector. It is the smallest information unit on a disk that is transferred in a single read or write operation. Usually a sector is 512 bytes in size. A sector on a disk can be addressed two ways: via the absolute number (see absolute sector) or via cylinder, head and sector number on a track.

System disk/partition is a disk/partition from which an operating system may be booted. Such a disk usually contains the boot sector and system files of this operating system.

System file is a file that contains the code and constant data for an operating system. Each operating system has its own system file set.

System folder. Some operating systems keep most of their files in a special folder on a partition that may be different from the system one. For example for Windows 95/98/Me, the IO.SYS system file resides on the system partition, while other system files are located in the system folder, which is usually called WINDOWS. The Program Files folder can also be treated as system since it resides on the same partition as WINDOWS and also contains files that are relevant to the operating system.

Status. A flag that shows if a partition is active. This flag is stored in the partition table and has no meaning for logical partitions.

Track. Disks are divided into concentric circles called tracks. Information from one track can be accessed without moving the head.

User interface is a set of principles, concepts and means by which programs interact with the user. For example, in window interface all input and output is done in windows, and the mouse is utilized quite often.

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